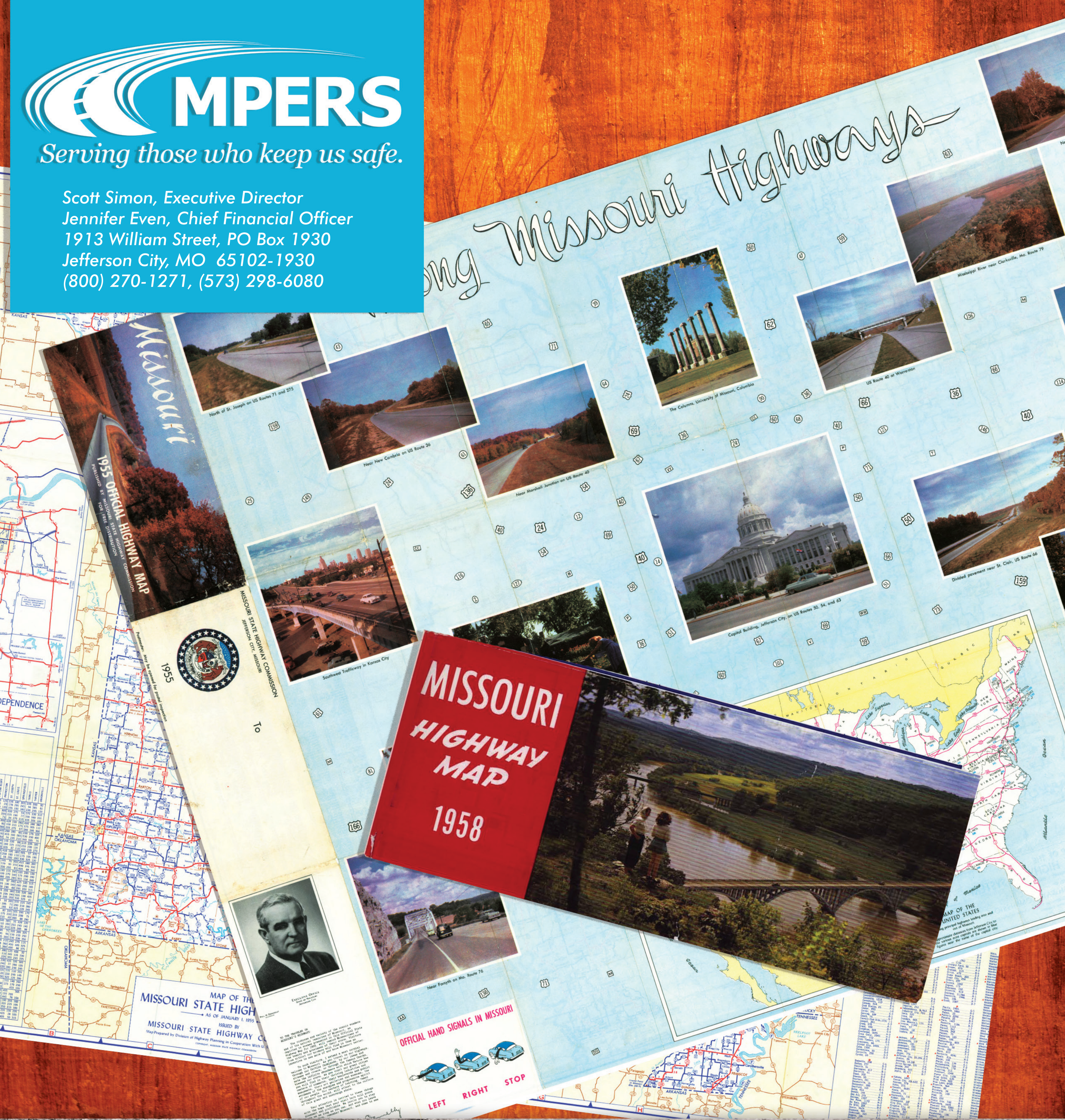
MPERS

Serving those who keep us safe.

Scott Simon, Executive Director
Jennifer Even, Chief Financial Officer
1913 William Street, PO Box 1930
Jefferson City, MO 65102-1930
(800) 270-1271, (573) 298-6080



Comprehensive Annual Financial Report 2018

For the Fiscal Year Ended June 30, 2018

Missouri Department of Transportation and Highway Patrol Employees' Retirement System

A Component Unit of the State of Missouri

All photos courtesy of MoDOT unless otherwise noted

MoDOT and Patrol Employees' Retirement System

MPERS' mission is to provide a foundation for financial security to plan participants by delivering quality benefits and exceptional member service through professional plan administration and prudent management of assets, at a reasonable cost to the taxpayers of Missouri.

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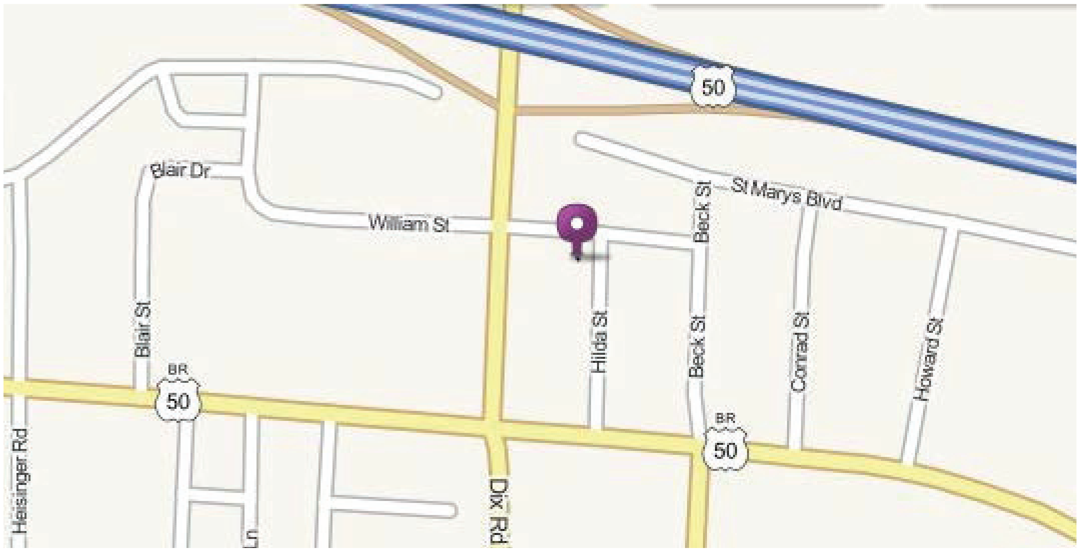

MPERS distributed this document digitally. No printing costs were incurred.

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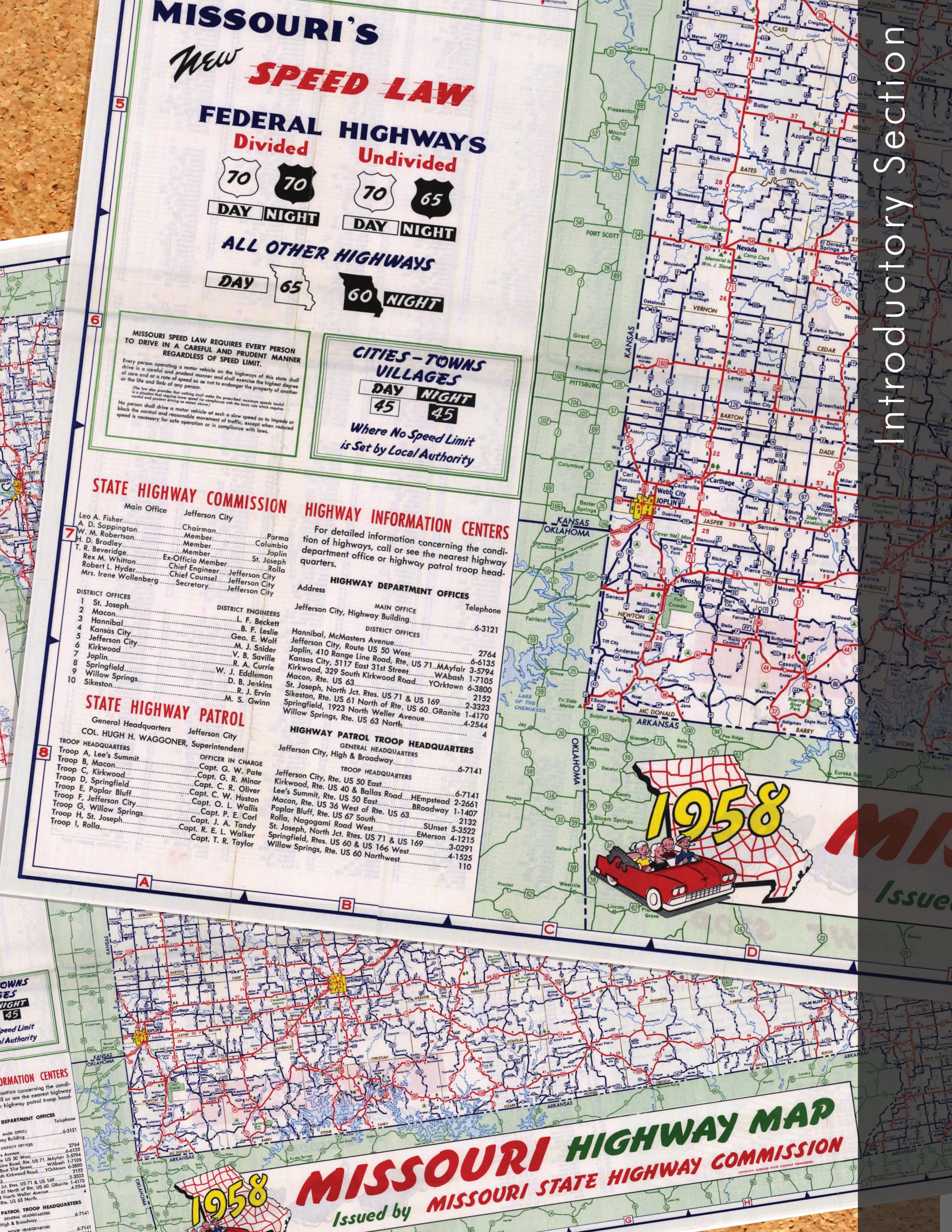
MISSOURI'S
New SPEED LAW
FEDERAL HIGHWAYS
Divided
70 DAY
70 NIGHT
Undivided
70 DAY
65 NIGHT
ALL OTHER HIGHWAYS
DAY 65
60 NIGHT
MISSOURI SPEED LAW REQUIRES EVERY PERSON TO DRIVE IN A CAREFUL AND PRUDENT MANNER REGARDLESS OF SPEED LIMIT.
Every person operating a motor vehicle on the highways of this state shall drive in a careful and prudent manner and shall exercise the highest degree of care and at a rate of speed so as not to endanger the property of another or the life and limb of any person.
(The law also provides that nothing shall make the prescribed maximum speeds lawful in a situation that requires lower speed for compliance with the basic rule which requires careful and prudent driving as stated above.)
No person shall drive a motor vehicle at such a slow speed as to impede or block the normal and reasonable movement of traffic, except when reduced speed is necessary for safe operation or in compliance with laws.
CITIES – TOWNS VILLAGES
DAY 45
NIGHT 45
Where No Speed Limit is Set by Local Authority
STATE HIGHWAY COMMISSION
Main Office Jefferson City
Leo A. Fisher.......Chairman.......Parma
A. D. Sappington.......Member.......Columbia
W. M. Robertson.......Member.......Joplin
H. D. Bradley.......Member.......St. Joseph
T. R. Beveridge.......Ex-Officio Member.......Rolla
Rex M. Whitton.......Chief Engineer.......Jefferson City
Robert L. Hyder.......Chief Counsel.......Jefferson City
Mrs. Irene Wollenberg.......Secretary.......Jefferson City
DISTRICT OFFICES
DISTRICT ENGINEERS
1 St. Joseph.......L. F. Beckett
2 Macon.......B. F. Leslie
3 Hannibal.......Geo. E. Wolf
4 Kansas City.......M. J. Snider
5 Jefferson City.......V. B. Saville
6 Kirkwood.......R. A. Currie
7 Joplin.......W. J. Eddlemon
8 Springfield.......D. B. Jenkins
9 Willow Springs.......R. J. Ervin
10 Sikeston.......M. S. Gwinn
STATE HIGHWAY PATROL
General Headquarters Jefferson City
COL. HUGH H. WAGGONER, Superintendent
TROOP HEADQUARTERS
OFFICER IN CHARGE
Troop A, Lee's Summit.......Capt. G. W. Pate
Troop B, Macon.......Capt. G. R. Minor
Troop C, Kirkwood.......Capt. C. R. Oliver
Troop D, Springfield.......Capt. C. W. Huston
Troop E, Poplar Bluff.......Capt. O. L. Wallis
Troop F, Jefferson City.......Capt. P. E. Corl
Troop G, Willow Springs.......Capt. J. A. Tandy
Troop H, St. Joseph.......Capt. R. E. L. Walker
Troop I, Rolla.......Capt. T. R. Taylor
HIGHWAY INFORMATION CENTERS
For detailed information concerning the condition of highways, call or see the nearest highway department office or highway patrol troop headquarters.
HIGHWAY DEPARTMENT OFFICES
Address
Telephone
MAIN OFFICE
Jefferson City, Highway Building.......6-3121
DISTRICT OFFICES
Hannibal, McMasters Avenue.......2764
Jefferson City, Route US 50 West.......6-6135
Joplin, 410 Range Line Road, Rte. US 71..MAyfair 3-5794
Kansas City, 5117 East 31st Street.......WAbash 1-7105
Kirkwood, 329 South Kirkwood Road.......YOrktown 6-3800
Macon, Rte. US 63.......2152
St. Joseph, North Jct. Rtes. US 71 & US 169.......2-3323
Sikeston, Rte. US 61 North of Rte. US 60..GRanite 1-4170
Springfield, 1923 North Weller Avenue.......4-2544
Willow Springs, Rte. US 63 North.......4
HIGHWAY PATROL TROOP HEADQUARTERS
GENERAL HEADQUARTERS
Jefferson City, High & Broadway.......6-7141
TROOP HEADQUARTERS
Jefferson City, Rte. US 50 East.......6-7141
Kirkwood, Rte. US 40 & Ballas Road....HEmpstead 2-2661
Lee's Summit, Rte. US 50 East.......BRoadway 1-1407
Macon, Rte. US 36 West of Rte. US 63.......2132
Poplar Bluff, Rte. US 67 South.......SUnset 5-3522
Rolla, Nagogami Road West.......EMerson 4-1215
St. Joseph, North Jct. Rtes. US 71 & US 169.......3-0291
Springfield, Rtes. US 60 & US 166 West.......4-1525
Willow Springs, Rte. US 60 Northwest.......110
1958
MISSOURI HIGHWAY MAP
Issued by MISSOURI STATE HIGHWAY COMMISSION

MoDOT & Patrol Employees' Retirement System

November 09, 2018

To the Board of Trustees and System Members:

We are pleased to provide this Comprehensive Annual Financial Report (CAFR), of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS), for the fiscal year ending June 30, 2018. This report is intended to provide MPERS' stakeholders with a thorough review of the System's operations for the past fiscal year. The material presented in this report has been prepared in a manner intended to be useful and informative to MPERS' members, the management of the Missouri Department of Transportation (MoDOT) and the Missouri State Highway Patrol (MSHP), and the elected officials of the state of Missouri.

MPERS is a defined benefit pension plan designed to be a valuable recruitment and retention tool for covered employers. It provides lifetime retirement benefits to eligible MoDOT and MSHP employees. The monthly retirement and survivor benefits provided by MPERS are a valuable source of retirement income for the members we serve. These benefits, when combined with social security and personal savings, provide the basic foundation for our members to leave the workforce and enjoy their retirement years with the dignity they deserve.

The average monthly benefit of a new MPERS retiree in Fiscal Year 2018 retiring directly from active employment was $2,325, which equates to $27,900 per year. Given the increasing cost of living, this amount alone will not provide a life of luxury for the retiree. However, this monthly benefit and those provided by other traditional pension plans have a significant impact that reaches beyond the retirees served. Over the past 10 years alone, MPERS has paid over $2.1 billion in benefit payments to its members. Nearly 95% of these retirees and beneficiaries reside in Missouri, reinvesting their retirement dollars in housing, goods, and services. This reinvestment improves the local economy which in turn, helps to fuel the state's overall economy. The result is that defined benefit pensions have a long-term positive impact on our economy and the lives of our members.

Report Contents and Structure:
This CAFR is designed to comply with the statutory reporting requirements stipulated in sections 104.190, 104.1006, and 105.661 of the Missouri Revised Statutes (RSMo), as amended.

To the best of our knowledge, the information presented is accurate in all material respects and is reported in a manner designed to fairly represent the financial position of the fund. Some amounts included in the financial statements and elsewhere may be based on estimates and judgments. These estimates and judgments were products of best business practices. The accounting policies followed in preparing the basic financial statements conform with U.S. generally accepted accounting principles. Financial information presented throughout the CAFR is consistent with information displayed in the basic financial statements.

The MPERS Board of Trustees (Board) is ultimately responsible for the CAFR and the basic financial statements. MPERS' executive director and staff prepare the information contained in the CAFR and the financial statements to assist the Board in fulfilling its statutory duty.

Systems of internal controls and supporting procedures are maintained to provide assurances that transactions are authorized, assets are safeguarded and proper records are maintained. These controls include standards in the hiring and training of employees, the establishment of an organizational structure, and the communication of policies and guidelines throughout the organization. Inherent limitations exist in all control systems. No evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud have been detected. The objective of internal controls is to provide reasonable assurance the financial statements are free of any material misstatements, recognizing that the cost of a control should not exceed the benefits to be derived.

Office Location: 1913 William St., Jefferson City, MO 65109 • **Mailing Address:** Post Office Box 1930, Jefferson City, MO 65102-1930
Telephone Number: (573) 298-6080 • **Toll Free:** 1-800-270-1271 • **Fax:** (573) 522-6111
Website: www.mpers.org • **E-Mail:** mpers@mpers.org

In accordance with section 104.190 RSMo, an independent auditing firm, Williams-Keepers, LLC, has audited the financial statements included in this report and has issued an unqualified opinion (i.e., no audit concerns relating to MPERS' financial statements). The opinion letter of Williams-Keepers, LLC is presented in the "Financial Section" of this CAFR. "Management's Discussion and Analysis" immediately follows the "Independent Auditors' Report" and provides a narrative introduction, overview, and analysis of the basic financial statements.

Background Information:
MPERS was established by Senate Bill 66 in the 68th General Assembly. In accordance with this legislation, employees of MoDOT and the MSHP became members of the retirement system on September 1, 1955. Effective October 1, 1955, the System accepted 109 retirements. Employees of MPERS became members of the system after passage of Senate Bill 371 in 2001.

The plan provisions have changed many times over the years. The System offers not only enhanced retirement and disability benefits, but also benefits for survivors of active and retired members, benefits for vested former members, and death benefits.

Our 11-member board is responsible for the oversight of MPERS. The trustees serve as fiduciaries to the members and are responsible for selecting and retaining competent management. The trustees and management jointly establish sound policies and objectives, monitor operations for compliance, and oversee performance.

MPERS is considered a component unit of the state of Missouri for financial reporting purposes and, as such, the financial statements in this report are also included in the State of Missouri's Comprehensive Annual Financial Report.

Fiscal Year 2018 Highlights:
The predominant effort for the year was connected to the vested former member buyout that was passed with Senate Bill 62 in 2017. This legislation established a limited time window for the Board to consider implementing a buyout that would allow vested former members the ability to accept a distribution of their vested interests in the retirement plan with a lump sum buyout rather than a monthly annuity. The Board did establish a buyout program that allowed eligible former members to elect a lump sum equal to 50 percent of the present value of their future monthly annuity. In preparation for the program, staff dedicated a significant amount of time and effort to update contact information for eligible participants, to verify member records ensuring accurate buyout estimates could be provided, to develop communications that were comprehensive yet understandable, and to issue the payments. The buyout election was offered from September through November. Out of 2,200 eligible members, 383 elected to take the lump sum payment. Those payments were issued in January 2018. For some perspective, MPERS normally initiates approximately 300 new benefit payments each year for new retirees. In the matter of a few months, we not only communicated and paid more than that but did so without the need for time consuming and costly changes to our pension administration system for this one-time event. The financial results of the buyout program allowed MPERS to reduce system liabilities by nearly $6 million—a modest but positive result.

Second only to the effort associated with the buyout window was the commitment to a service audit project that started a few years ago. The benefits staff completed this review of 30,000 member records during this fiscal year. The massive project was initiated to ensure the accuracy of member service and salary records. The project was expected to take up to five years to complete, but through the concerted efforts of MPERS' staff, it was completed in only three years.

With the budget approved during the last year, the Board authorized the addition of a communications specialist to the MPERS staff. Over the years, MPERS has utilized the talents of several staff members to accomplish the communication efforts of the system. While we believe those results have been notable and responsible, we believe having a dedicated staff person for that purpose will greatly improve our ability to communicate and enhance our value to our members, stakeholders, and taxpayers. That individual is set to start with the organization soon so changes and improvements should be noticeable in the very near future.

On the subject of enhancing our communication efforts, staff produced MPERS' first summary annual report, typically called the popular annual financial report, for the prior fiscal year. This publication is based on MPERS FYI publication and it was adjusted to satisfy the reporting requirements of the Governmental Finance Officers Association of the United States and Canada (GFOA). We are pleased to announce that the first edition of this report received the GFOA Certificate of Accomplishment for Financial Reporting. This summary report provides stakeholders and other interested parties with important information highlighting the financial condition of the system along with other pertinent historical details.

Risk management efforts continue to be a priority. A notable tool associated with those efforts included an anonymous fraud reporting tool available through MPERS' website. This allows anyone the ability to raise a concern that should be investigated to be sure resources are being applied responsibly.

MPERS is fortunate to enjoy limited staff turnover. Nonetheless, an area that needed attention was having a formalized training plan to assure thorough and comprehensive training as new hires come on board. Over the last year, a plan was created and finalized to provide training guidance for all operations positions. These position-specific plans should provide a better experience for new employees, support ongoing service to our members during a time of transition, and make more efficient use of our resources.

It would be inconsiderate to not acknowledge the continued success of our investment program. Performance results are noted later in this letter where you will see a track record in which staff, members, and stakeholders should be proud.

Actuarial Funding Status:
The funding objective of MPERS is to meet future benefit obligations of retirees and beneficiaries through investment earnings and payroll contributions that remain approximately level from generation to generation. Historical information relating to this objective is presented in the "Schedule of Funding Progress" in the "Actuarial Section" of this report. During the fiscal year ending June 30, 2018, the funded ratio of MPERS, which covers 18,367 participants, remained stable at 57.12%.

Each year an independent actuarial firm conducts a valuation study to determine the actuarial soundness of the Plan, based on its long-term obligations and the sufficiency of current contribution levels to fund the liabilities over a reasonable timeframe. In our most recent valuation dated June 30, 2018, our actuary concluded that the System continues to be financed in accordance with actuarial standards using the level percent of payroll financing method. The actuary's conclusion is based upon the fact that the employers are contributing to the System according to actuarially determined rates and presumes the continuation of payment of actuarially determined contributions. Additional information regarding the financial condition of the System can be found in the "Actuarial Section" of this report.

In an effort to address the System's underfunding situation, in September 2006, the Board adopted a permanent funding policy that was intended to improve MPERS' funded status over a shorter timeframe.

The permanent funding policy states the following:
- The total contribution is based on the Plan's normal cost with a 29-year amortization period for MPERS' unfunded actuarial accrued liabilities. The financing period is a closed period that started July 1, 2007.

On September 17, 2009, after the Great Recession, the Board adopted the following temporary accelerated funding policy:
- The total contribution is based on the Plan's normal cost with a 15-year amortization period for unfunded retiree liabilities and a 30-year amortization period for other unfunded liabilities. Both amortization periods are closed periods that started July 1, 2010.
- The temporary accelerated funding policy will remain in effect until such time as the retiree liability becomes 100% funded or the permanent funding policy produces a higher contribution rate.

On September 24, 2014, the Board adopted a Rate Stabilization Reserve Fund intended to further reinforce the aggressive funding polices noted in the temporary policy above. The reserve fund was developed by maintaining employer contribution rates at present levels by applying investment gains to the reserve fund rather than decreasing employer contribution rates. When losses are experienced the reserve fund would be used first rather than increasing employer contribution rates. The reserve fund provides a smoothing of our overall experience that further decreases the potential volatility of contributions for our covered employers.

As of June 30, 2018, the permanent funding policy is at a closed amortization period of 17 years and the temporary accelerated funding policy is at a closed amortization period of 6 years for unfunded retiree liabilities and 21 years for other unfunded liabilities.

Investment Activities:
State statutes and other applicable law require the System to make investments using the same care, skill, and diligence that a prudent investor acting in a similar capacity would use. In fulfilling this obligation, the Board has established a formal investment policy to clearly define the roles and responsibilities of the Board, staff and consultants, and to ensure that System assets are invested in a diversified portfolio following prudent investment standards. The Board determines the broad asset allocation policies and return objectives of the Plan. To implement and execute these policies, the Board retains investment staff, consultants, a master custodian, and other advisors.

As of June 30, 2018, MPERS' investment portfolio had a total fair value of $2.3 billion, representing a return of 9.42 percent for the fiscal year. The portfolio continues to perform well versus our peer group, particularly over longer

periods. Relative to our peer group, which is the InvestorForce Public Fund Universe, the 9.42 percent return for Fiscal Year 2018 ranked MPERS in the 8th percentile, outpacing 92 percent of other public funds within the peer group. The trailing three- and five-year performance of 7.13 percent and 9.04 percent, respectively, ranks MPERS in the top 18 percent and 3 percent, respectively, of the peer group. The trailing 10-year performance of 6.40 percent ranks MPERS in the top 40 percent of the peer group.

Awards:
The GFOA awarded a Certificate of Achievement for Excellence in Financial Reporting to MPERS for its fiscal year 2017 CAFR. This was the 13th consecutive year that MPERS has achieved this prestigious award. The Certificate of Achievement is the highest form of recognition for excellence in state and local government financial reporting. To be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized CAFR. This report must satisfy both generally accepted accounting principles and applicable legal and GFOA reporting requirements.

A Certificate of Achievement is valid for a period of one year. We believe that our current CAFR continues to meet the program's requirements, and therefore, we are submitting this report to GFOA to determine its eligibility for another certificate.

MPERS also received the Public Pension Coordinating Council's (PPCC) Public Pension Standards Award in recognition of meeting professional standards for plan design and administration. This is the 14th consecutive year MPERS received the Council's award. This award is presented by the PPCC, a confederation of the National Association of State Retirement Administrators, the National Conference on Public Employee Retirement Systems, and the National Council on Teacher Retirement. MPERS' staff and board is pleased to receive these prestigious awards for financial and professional standards of excellence and may be viewed after this transmittal letter.

Acknowledgements and Distribution:
This report, a product of the combined efforts of MPERS' staff and advisors, is intended to provide comprehensive and reliable information about the System, to demonstrate compliance with legal provisions, and to allow for the evaluation of responsible stewardship of the System's funds.

This report is provided to the governor, the state auditor, and the Joint Committee on Public Employee Retirement. It is also distributed electronically to all MoDOT divisions, district offices, MSHP general headquarters, and troop headquarters. These offices form the link between MPERS and its members, and their cooperation contributes significantly to the success of MPERS. We hope all readers of this report find it informative and useful. An electronic version of this report is available on the MPERS website at www.mpers.org.

We express our gratitude to the members of the Board, the staff, the consultants, and the many people who have worked so diligently to assure the continued successful operation of MPERS. The steady, monthly benefit payments offered by defined benefit plans, like MPERS, provide peace of mind and security for retirees and their families. For over 60 years, MPERS has been committed to providing a foundation for financial security to plan participants through the delivery of quality benefits, exceptional member service and professional plan administration.

Respectfully submitted,

Scott Simon	Sue Cox
Executive Director	Board Chair

Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

Missouri Department of Transportation and Highway Patrol Employees' Retirement System

For its Comprehensive Annual Financial Report for the Fiscal Year Ended

June 30, 2017

Christopher P. Morrill

Executive Director/CEO

Public Pension Coordinating Council Award

Public Pension Coordinating Council

Public Pension Standards Award
For Funding and Administration
2018

Presented to

MoDOT & Patrol Employees' Retirement System

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

Presented by the Public Pension Coordinating Council, a confederation of

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

Alan H. Winkle
Alan H. Winkle
Program Administrator

Board of Trustees

MPERS is governed by an eleven-member Board of Trustees, as set out in section 104.160 of the Missouri Revised Statutes. Board members as of June 30, 2018:

Sue Cox

Board Chair
MoDOT Retiree
Representative

Elected by Retired
Members of MoDOT
Term Expires 7-1-2022

William "Bill" Seibert

Board Vice Chair
MSHP Retiree
Representative

Elected by Retired
Members of MSHP
Term Expires 7-1-2022

John Briscoe

Commission Member

Highways & Transportation
Commissioner
Term Expires 3-1-2021

Sergeant Matt Broniec

MSHP Employee
Representative

Elected by MSHP Employees
Term Expires 7-1-2022

Colonel Sandra K. Karsten

Superintendent
of the Missouri
State Highway Patrol

Ex-Officio Member

Patrick McKenna

Director of the Missouri
Department of
Transportation

Ex-Officio Member

Michael B. Pace

Commission Member

Highways & Transportation
Commissioner
Term Expires 3-1-2019

Vacant

State Representative
Appointed by
Speaker of the House

Senator Dave Schatz

State Senator

District 26
Appointed by
President Pro-Tem
of the Senate

Gregg Smith

Commission Member

Highways & Transportation
Commissioner
Term Expires 3-1-2019

Todd Tyler

MoDOT Employee
Representative

Elected by MoDOT Employees
Term Expires 7-1-2022

MPERS
Serving those who keep us safe.

Administrative Organization

The executive director of MPERS has charge of the offices and records of the System and hires such employees deemed necessary, subject to the approval of the Board of Trustees. As of June 30, 2018, the System employed sixteen full-time and one part-time staff.

- **Board of Trustees**
  - **Scott Simon**, Executive Director
    - Director's Office: **Lois Wankum**, Executive Assistant II
      - **Barbara Graessle**, Administrative Assistant II
    - Member Services: **Greg Beck**, Assistant Executive Director
      - **Mary Jordan**, Benefit Speciaist III
      - **Jamie Mullen**, Benefit Specialist III
      - **Beverly Wilson**, Benefit Audit Specialist
        - **Angel Backes**, Account Technician III
        - **Tammy Kroll**, Account Technician III
        - **Leigh Love**, Account Technician III
    - Legal Services: **Greta Bassett-Seymour**, General Counsel
    - Financial Services: **Jennifer Even**, Chief Financial Officer
      - **Mary Sue Fontana**, Assistant CFO (part-time position)
    - Investments: **Larry Krummen**, Chief Investment Officer
      - **Jennifer Johnson**, Manager-Hedge Funds and Private Equity
      - **Bobby Hagedorn**, Manager-Real Assets and Credit
      - **Tinisha Eickhoff**, Investment Officer

Executive Team:
Larry Krummen-Chief Investment Officer, Jennifer Even–Chief Financial Officer, Scott Simon-Executive Director, Greta Bassett-Seymour-General Counsel, Greg Beck-Assistant Executive Director

Administrative Organization

Director's Office

The Director's Office staff provides executive oversight for the System which includes, but is not limited to administrative support in the areas of legislation, stakeholder communications, operations, benefits, risk management, and investments. The Director's Office is also responsible for providing the Board with information and reports on the activities of the System.

Financial Services

The Financial Services section is responsible for maintaining all the financial records of MPERS. The chief financial officer (CFO) interacts with the investment custodian, the auditors, the depository bank, Missouri's Department of Revenue, and the Internal Revenue Service. In addition, the CFO assists the chief investment officer in tracking and predicting target cash balances, participates in annual budget development, prepares monthly budget-to-actual reports, and calculates monthly premium payments to the long-term disability insurer. The CFO also processes MPERS' semi-monthly office payrolls, reconciles monthly benefit payments and contributions/payrolls posted, and reconciles investment activity.

Investments

The Investments section staff works closely with the general investment consultant to manage the investment portfolio and provide consulting services to the Board and the executive director. This includes, but is not limited to: (a) formulating investment policy and asset recommendations, (b) sourcing, selecting, monitoring, and evaluating external investment advisors, (c) measuring and reporting investment performance, (d) conducting market research on political, financial, and economic developments that may affect the System, and (e) serving as a liaison to the investment community.

Legal Services

The Legal Services section advises the executive director and Board on legal matters, reviews and approves investment and other contracts for MPERS, advises staff on the application of state and federal statutes affecting the administration of plan benefits, responds to requests from members and their attorneys related to plan benefits, engages in or oversees litigation affecting MPERS, and assists in developing policies, rules, and legislation impacting MPERS' operations or the administration of plan benefits.

Member Services

The Member Services section consists of two units devoted to serving member needs.

The Benefits Unit is responsible for contact with the membership regarding the benefit programs administered by MPERS, which include retirement and disability. The benefit staff is responsible for preparing and delivering the pre-retirement and benefit basics seminars in addition to assisting with the development of member communication material. The benefit staff is the main point of contact with members who have questions about their retirement.

The Payroll Unit is responsible for establishing and maintaining all membership records including: (a) maintaining member data on the pension administration system, (b) verifying retirement calculations, (c) balancing payroll deductions, (d) verifying SAM II data against exception reports, and (e) entering payroll, service, and leave data into the System's computerized database. Payroll Unit staff will also create and publish communication materials, assist with pre-retirement seminars, provide data to the actuary, as well as reviewing member records for accuracy and completeness.

Professional Services

The following firms were retained at fiscal year-end by the Board of Trustees to serve in professional capacities or provide consultant services. Please refer to pages 46 and 47 in the Investment Section for the Schedule of Investment Expenses and Brokerage Commissions for the investment professionals.

Actuary

Gabriel, Roeder, Smith & Company
Southfield, Michigan

Auditor

Williams-Keepers, LLC
Jefferson City, Missouri

Investment Consultant

NEPC
Cambridge, Massachusetts

Information Technology

Levi, Ray & Shoup, Inc.
Springfield, Illinois

Huber & Associates
Jefferson City, Missouri

Legislative Consultant

Michael G. Winter Consultants, LLC
Jefferson City, Missouri

Master Trustee/Custodian

The Northern Trust Company
Chicago, Illinois

Risk Management/Insurance Consultant

Charlesworth Benefits
Overland Park, Kansas

Long-Term Disability Insurer

The Standard Insurance Company
Portland, Oregon

Professional Services

Investment Managers

Aberdeen Asset Management	Philadelphia, Pennsylvania
ABRY Partners	Boston, Massachusetts
Acadian Asset Management	Boston, Massachusetts
AEW Partners	Boston, Massachusetts
Aisling Capital	New York, New York
Albourne America	San Francisco, California
Alpstone Capital	Genève, Switzerland
Alyeska Investment Group	Chicago, Illinois
American Infrastructure MLP	Foster City, California
American Timberlands Company	Columbia, South Carolina
Anchorage Capital Group	New York, New York
Apollo Aviation Group	New York, New York
Ares Management	New York, New York
Arrowroot Capital	Santa Monica, California
Audax Group	Boston, Massachusetts
Blackstone	New York, New York
Blue Road Capital	New York, New York
Bridgewater Associates	Westport, Connecticut
Capital Partners	Norwalk, Connecticut
CarVal Investors (CVI)	Minnetonka, Minnesota
CatchMark Timber	Atlanta, Georgia
CBRE Investors	Baltimore, Maryland
Cevian Capital Limited	Jersy, Channel Islands
CenterSquare Investment Management	Plymouth Meeting, Pennsylvania
CIM Group	Los Angeles, California
Clarion Partners	Jersy, Channel Islands
Colony Capital	Los Angeles, California
Corrum Capital	San Francisco, California
DC Capital	Alexandria, Virginia
Deephaven Capital Management	Minnetonka, Minnesota
EIF Management	Needham, Massachusetts
Energy & Mineral Group	Houston, Texas
GMO	Boston, Massachusetts
Golden Sciens Marine Investments	New York, New York
Golub Capital	New York, New York
Grey Rock Energy Partners	Dallas, Texas
Grove Street Advisors	Wellesley, Massachusetts
GSO Capital Partners	New York, New York
Indus Capital	New York, New York
Kennedy Capital	St. Louis, Missouri
KPS Capital Partners	New York, New York
Long Ridge Equity Partners	New York, New York
Long Ford Capital Management	Chicago, Illinois
Luxor Capital	New York, New York
M&G Investments	London, United Kingdom
MGG Investment Group	New York, New York
McCaslin Barros Henderson	Dallas, Texas
MiraVast	New York, New York
Metacapital Management	New York, New York
Millennium Management	New York, New York
Monomoy Capital Partners	New York, New York
Natural Gas Partners	Houston, Texas
Ned Davis	Venice, Florida

Professional Services

Investment Managers

NewQuest Capital Partners .... Central, Hong Kong
Mew Mountain Capital .... New York, New York
Nexus Capital Management .... New York, New York
Northern Shipping .... Stamford, Connecticut
Oak Street Real Estate Capital .... Chicago, Illinois
Och-Ziff Real Estate .... New York, New York
OCP Asia .... Singapore
Opengate Capital Partners .... Los Angeles, California
Orion Mine Finance Group .... New York, New York
Octagon Credit Investors .... New York, New York
Ospraie Management .... New York, New York
Owl Rock Capital Partners .... New York, New York
Parametric .... Minneapolis, Minnesota
Partner Fund Management .... San Francisco, California
Pentwater .... Evanston, Illinois
Pfingsten Partners .... Chicago, Illinois
Principal Global Investors .... Des Moines, Iowa
Quantum Energy Partners .... Houston, Texas
Ridgewood Energy .... Montvale, New Jersey
Riverstone Credit Partners .... New York, New York
Shore Capital Partners .... Chicago, Illinois
Shoreline Capital .... Guangzhou, China
Sigular Guff and Company .... New York, New York
Silchester International Investors Limited .... London, United Kingdom
Stark Investments (Shepherd) .... Milwaukee, Wisconsin
Systematica Investments .... New York, New York
Timberland Investment Resources .... Atlanta, Georgia
Torchlight Investors .... New York, New York
Tortoise Capital Advisors .... Leawood, Kansas
Tristan Capital Partners .... London, United Kingdom
Turnbridge Capital Partners .... Houston, Texas
ValueAct Capital .... San Francisco, California
Varde Asia .... New York, New York
Vectis Healthcare .... Boston, Massachusetts

Notes

Financial Section

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CERTIFIED PUBLIC ACCOUNTANTS & CONSULTANTS

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3220 West Edgewood, Suite E, Jefferson City, MO 65109
OFFICE (573) 635-6196 FAX (573) 644-7240
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INDEPENDENT AUDITORS' REPORT

The Board of Trustees
Missouri Department of Transportation and
Highway Patrol Employees' Retirement System

Report on the Financial Statements

We have audited the accompanying statement of fiduciary net position of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System), as of June 30, 2018, and the related statement of changes in fiduciary net position for the year then ended, and the related notes to the financial statements, which collectively comprise the System's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with U.S. generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the System's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System at June 30, 2018, and the changes in fiduciary net position for the year then ended, in conformity with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 3 through 6 and the schedules of changes in the employers' net pension liability, employers' contributions, investment returns, changes in net OPEB liability and related ratios, MPERS' proportionate share of net OPEB liability, and related notes on pages 28 through 30 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context.

We have applied certain limited procedures to the required supplementary information in accordance with U.S. generally accepted auditing standards, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the System's basic financial statements. The introductory, investment, actuarial and statistical sections and the additional information presented on pages 31 through 33 are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The additional information presented on pages 31 through 33 is the responsibility of management and was derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. The additional information presented on pages 31 through 33 has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with U.S. generally accepted auditing standards. In our opinion, the additional information presented on pages 31 through 33 is fairly stated in all material respects in relation to the basic financial statements as a whole.

The introductory, investment, actuarial and statistical sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements and, accordingly, we do not express an opinion or provide any assurance on them.

Williams-Keepers LLC

November 9, 2018

Management's Discussion and Analysis

The management of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System, or MPERS) provides this discussion and analysis of the System's financial performance for the fiscal year ended June 30, 2018. While this discussion is intended to summarize the financial status of MPERS, readers should consider this information in conjunction with the information that is furnished in the more detailed financial statements and corresponding notes.

DESCRIPTION OF BASIC FINANCIAL STATEMENTS

As required by the Governmental Accounting Standards Board (GASB) accounting standards, this financial report consists of Management's Discussion and Analysis (this section), the basic financial statements (including notes to the basic financial statements), and other required supplementary information.

Financial Statements report information about MPERS, using accounting methods similar to those used by private-sector companies, by using the economic resources measurement focus and accrual basis of accounting. These statements provide both long-term and short-term information about the System's overall financial status. These statements follow this Management's Discussion and Analysis section:

- The *Statement of Fiduciary Net Position* includes all the System's assets and liabilities, with the difference between the two reported as net position.
- The *Statement of Changes in Fiduciary Net Position* Position accounts for all the current year's additions (income) and deductions (expenses), regardless of when cash is received or paid.

Notes to the Financial Statements are included following the financial statements. The notes to the financial statements provide additional information that is essential for a full understanding of the data provided in the financial statements.

Required Supplementary Information follows the notes and further supports the information in the financial statements.

ANALYSIS OF FINANCIAL POSITION AND RESULTS OF OPERATIONS

Overall, the financial position of MPERS strengthened by $145 million, reported as the "net increase." This is primarily a result of net appreciation in the fair value of investments for the year ended June 30, 2018. The funded status of the plan remained consistent with the prior year, due to actuarial gains offset by changes in actuarial assumptions.

The following schedules present summarized comparative data from the System's financial statements for each of the fiscal years ended June 30, 2018 and 2017. Following each schedule is a brief summary providing explanation and analyses of the major reasons for changes in the condensed financial statements.

Summarized Comparative Statements of Fiduciary Net Position

	As of June 30, 2018	As of June 30, 2017	% Change 2018/2017
Cash and Receivables	$ $22,452,794	$ 18,697,840	20
Investments	2,306,942,650	2,162,264,152	7
Invested Securities Lending Collateral	133,616,408	56,823,478	135
Capital Assets	858,546	1,204,317	-29
Total Assets	**2,463,870,398**	**2,238,989,787**	**10**
Deferred Outflows of Resources	**34,090**	**--**	**n/a**
Accounts Payable	8,789,084	10,109,326	-13
OPEB Obligation	1,545,180	715,962	116
Securities Lending Collateral	138,840,857	58,389,459	138
Total Liabilities	**149,175,121**	**69,214,747**	**116**
Deferred Inflows of Resources	**199,219**	**--**	**n/a**
Net Position	**$ 2,314,530,148**	**$2,169,775,040**	**7**

The increase in cash and receivables is primarily attributable to increased accrued investment interest and investment sales receivables as of June 30, 2018. Some fluctuations in this area are normal, based on investment activity.

The System's investments represent the main component of total assets. These investments include equities, fixed income, limited partnerships, hedge funds, and short-term investments. The increase in fair value of investments as of June 30, 2018 is primarily due to favorable market conditions experienced during the year. The fiscal year 2018 investment return was 9.42% as calculated on a time-weighted rate of return methodology.

Capital assets decreased in fiscal year 2018 due to depreciation of existing assets and no purchases of new equipment during the year.

The addition of deferred outflows of resources related to OPEB (Other Post-Employment Benefits), required by Governmental Accounting Standards Board (GASB) Statement 75 in fiscal year 2018, had a minimal effect on MPERS' financial statements. The deferred outflows of resources relate to the timing of contributions paid.

The decrease in accounts payable for fiscal year 2018 is primarily attributable to lower investment purchases payable. Some fluctuations in this area are normal, based on investment activity.

The OPEB obligation liability of $1,545,180 at June 30, 2018 and $715,962 at June 30, 2017 reflects MPERS' provision of post-employment health care benefits through its participation in the MoDOT and MSHP Medical and Life Insurance Plan. This plan is an internal service fund of the Missouri Department of Transportation; therefore, assets have not been set aside. With this, the increase from fiscal year 2017 to fiscal year 2018 is expected.

The largest component of liabilities is securities lending collateral. This represents the amount owed for collateral to be returned as the result of investment securities lent. The increase in securities lending collateral liability from fiscal year 2017 to fiscal year 2018 is due to the increase in the fair value of investments and more securities being utilized for lending. The corresponding securities lending collateral asset is valued at a lower amount than the securities lending collateral liability at June 30, 2018 due to the fair value of the securities on loan being less than the collateral value.

The addition of deferred inflows of resources related to OPEB, required by GASB Statement 75 in fiscal year 2018, had a minimal effect on MPERS' financial statements. The deferred inflows of resources relate primarily to the amortization of changes in actuarial assumptions.

Management's Discussion and Analysis

The System's total net position was $2.315 billion at June 30, 2018, a $145 million increase from the $2.170 billion at June 30, 2017.

Summarized Comparative Statements of Changes in Fiduciary Net Position

	As of June 30, 2018	As of June 30, 2017	% Change 2018/2017
Contributions	$ 211,824,042	$ 213,198,963	-1
Net Investment Income	197,619,367	220,301,127	-10
Other Income	472	614	-23
Total Additions	**409,443,881**	**433,500,704**	**-6**
Benefits	259,058,863	251,284,152	3
Administrative Expenses	4,693,492	4,515,458	4
Total Deductions	**263,752,355**	**255,799,610**	**3**
Net Increase	145,691,526	177,701,094	-18
Net Position-Beginning	2,168,838,622	1,992,073,946	9
Net Position-Ending	**$ 2,314,530,148**	**$2,169,775,040**	**7**
OPEB Implementation Adjustment		(936,418)	
Net Position-Ending, as Restated		**$2,168,838,622**	

Net investment income, a primary component of plan additions, resulted in income of $198 million for fiscal year 2018, represented a 9.45% return for the fiscal year ended June 30, 2018. In comparison, the fiscal year 2017 gain of $220 million represented an investment return of 11.22%. Annual fluctuations within the broad investment markets are outside the control of the System and are expected to fluctuate from year to year. The Board of Trustees has approved a diversified asset allocation that, over long periods of time, is expected to realize the assumed actuarial rate of investment return of 7.00%.

Benefits increased due to an increase in the total number of retirees for the years shown and due to a one-time buyout option offered to terminated vested members. The buyout payment was 50% of the present value of the member's deferred normal retirement annuity. Approximately 17% of the eligible terminated vested members participated in the buyout provision resulting in $5.69 million paid to 383 members.

Administrative expenses increased in fiscal year 2018 primarily due to career progression and general increases in the costs of services.

GASB Statement 75, Accounting and Financial Reporting for Postemployment Benefits Other than Pensions (OPEB) was implemented in fiscal year 2018. This required an OPEB implementation adjustment to fiscal year 2017 to realize the OPEB liability in accordance with the new statement. See Note 10 in the Notes to the Financial Statements for complete disclosure information.

CURRENTLY KNOWN FACTS AND RECENT EVENTS

Based on the June 30, 2018 actuarial valuation, the Board of Trustees approved no change in the required state contribution rate, effective July 1, 2019. The rate applied to both non-uniformed payroll (MoDOT, civilian patrol, and MPERS) and uniformed patrol payroll remains at 58.00%.

Based on the June 30, 2017 actuarial valuation, the Board of Trustees approved no change in the required state contribution, effective July 1, 2018. The rate applied to both non-uniformed payroll (MoDOT, civilian patrol and MPERS) and uniformed patrol payroll remained at 58.00%.

CONTACTING THE RETIREMENT SYSTEM'S MANAGEMENT

This financial report is designed to provide a general overview of the System's finances. Questions about this report or requests for additional financial information should be sent to:

MoDOT and Patrol Employees' Retirement System
PO Box 1930
Jefferson City, MO 65102-1930
mpers@mpers.org

Statement of Fiduciary Net Position

As of June 30, 2018

ASSETS:	
Cash	$ 539,497
Receivables	
Contributions	8,686,626
Accrued Interest and Income	6,383,098
Investment Sales	6,843,573
Total Receivables	21,913,297
Investments, at Fair Value	
Equities	470,017,822
Fixed Income	656,008,238
Limited Partnerships	981,543,412
Hedge Funds	147,595,231
Short-Term Investments	51,777,947
Total Investments	2,306,942,650
Invested Securities Lending Collateral	133,616,408
Net Investment in Capital Assets	
Land	84,000
Building	581,619
Furniture, Equipment and Software	3,504,218
Accumulated Depreciation	(3,311,291)
Net Investment in Capital Assets	858,546
TOTAL ASSETS	**$2,463,870,398**
DEFERRED OUTFLOWS OF RESOURCES	**$34,090**
LIABILITIES:	
Accounts Payable	$1,731,684
OPEB Obligation	1,545,180
Securities Lending Collateral	138,840,857
Investment Purchases	7,057,400
TOTAL LIABILITIES	**$ 149,175,121**
DEFERRED INFLOWS OF RESOURCES	**$199,219**
NET POSITION RESTRICTED FOR PENSIONS	**$2,314,530,148**

See accompanying Notes to the Financial Statements.

Statement of Changes in Fiduciary Net Position

For the Year Ended June 30, 2018

ADDITIONS:	
Contributions-Employer	$ 204,955,180
Contributions-Employee	3,721,983
Contributions-Service Transfers from Other System	1,867,445
Contributions-Other	1,279,434
Total Contributions	211,824,042
Investment Income from Investing Activities	
Net Appreciation in Fair Value of Investments	157,187,088
Interest and Dividends	70,726,752
Less: Investment Expenses	30,486,906
Net Investment Income	197,426,934
Income from Securities Lending Activities	
Securities Lending Gross Income	985,860
Less: Securities Lending Expenses, net	793,427
Net Income from Securities Lending Activities	192,433
Other Income	472
TOTAL ADDITIONS	**$ 409,443,881**
DEDUCTIONS:	
Monthly Benefits	
Retiree and Survivor Annuity Benefits	237,850,981
BackDROP Payments	14,546,108
Disability Benefits	2,475,725
Death Benefits	860,000
Service Transfer Payments	2,823,042
Employee Contribution Refunds	503,007
Administrative Expenses	4,693,492
TOTAL DEDUCTIONS	**$ 263,752,355**
NET INCREASE	145,691,526
NET POSITION RESTRICTED FOR PENSIONS	
Beginning of Year	**$2,169,775,040**
Adjustment for OPEB Reporting Implementation	(936,418)
Beginning of Year, Restated	**2,168,838,622**
End of Year	**$2,314,530,148**

See accompanying Notes to the Financial Statements.

Notes to the Financial Statements
For the Year Ended June 30, 2018

NOTE 1 - SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

As established under Section 104.020 of the Revised Statutes of Missouri (RSMo), the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is a body corporate and an instrumentality of the State of Missouri (State). Due to the nature of MPERS' reliance on funding from the Missouri Department of Transportation (MoDOT) and the Missouri State Highway Patrol (MSHP) and control of the overall plan document by the legislative and executive branches of state government, MPERS is considered a part of the State of Missouri financial reporting entity and is included in the State's financial reports as a component unit shown as a pension trust fund.

Note 1 (a) - Basis of Accounting

The financial statements were prepared using the accrual basis of accounting. Contributions are due to MPERS when employee services have been performed and paid. Contributions are recognized as revenues when due, pursuant to statutory requirements. Benefits are recognized when due and payable and expenses are recorded when the corresponding obligations are incurred. Dividend income is recognized when dividends are declared. Interest income is recognized when earned.

The Governmental Accounting Standards Board (GASB) approved a new accounting and reporting standard, GASB Statement 75, Accounting and Financial Reporting for Postemployment Benefits Other than Pensions. GASB 75 is effective for fiscal years beginning after June 15, 2017.

The primary objective of GASB 75 is to improve accounting and financial reporting for postemployment benefits other than pensions (other postemployment benefits or OPEB). This statement establishes standards for recognizing and measuring liabilities, deferred outflows of resources, deferred inflows of resources, and expenses/expenditures. Comprehensive footnote disclosure regarding this statement is presented in Note 10.

Note 1 (b) - Method Used to Value Investments

Investments are reported at fair value on a trade date basis. Bonds and stocks traded on a national or international exchange are valued at the reported sales price at current exchange rates. Mortgages are valued on the basis of future principal and interest payments and are discounted at prevailing interest rates for similar instruments. The fair value of real estate and timber investments are based on net asset value estimates provided by the general partners' administrators or portfolio managers, which are compared to independent appraisals. Investments that do not have an established market are reported at estimated fair value. The fair value of the hedge fund portfolios and partnership portfolios are based on valuations of the underlying assets as reported by the general partner or portfolio manager.

Note 1 (c) - Net Investment in Capital Assets

MPERS capitalizes assets with an expected useful life greater than one year and a cost greater than $5,000. Capital assets are depreciated on the straight-line method over the estimated useful lives of the related assets. The estimated useful lives are as follows:

Furniture, Equipment and Software	3 – 10 years
Building and Improvements	30 years

Note 1 (d) - Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

NOTE 2 – PLAN DESCRIPTIONS AND CONTRIBUTION INFORMATION

MPERS is a body corporate and an instrumentality of the state as a multiple-employer, public employee retirement system with one plan that has three benefit structures known as the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan-2011 Tier. The plan provides retirement, survivor, and disability benefits for employees of MoDOT, MSHP, and MPERS. The plan is administered in accordance with the requirements of a cost sharing, multiple-employer, public employee retirement plan under the Revised Statutes of Missouri. In MPERS are vested the powers and duties specified in sections 104.010 to 104.312, 104.601 to 104.805, and 104.1003 to 104.1093, RSMo, and such other powers as may be necessary or proper to enable it, its officers, employees, and agents to carry out fully and effectively all the purposes outlined pursuant to these sections.

Responsibility for the operation and administration of the System is vested in the Board of Trustees, which consists of eleven members, four elected by the active and retired plan members, three Highway and Transportation Commissioners, a State Senator appointed by the President Pro-Tem of the Senate, a State Representative appointed by the Speaker of the House, and the Director of the MoDOT and Superintendent of the MSHP who serve as ex-officio members. Detailed information regarding contributions can be found in Note 5.

Generally, all covered employees hired before July 1, 2000, are eligible for membership in the Closed Plan. All covered employees hired on or after July 1, 2000, and before January 1, 2011, are eligible for membership in the Year 2000 Plan. All covered employees hired on or after January 1, 2011 are eligible for membership in the Year 2000 Plan's 2011 Tier.

Membership in the Closed Plan, Year 2000 Plan, and 2011 Tier As of June 30, 2018

	Closed	Year 2000	2011 Tier	Total
Retirees, Beneficiaries, and Disabilities Currently Receiving Benefits	4,974	3,985	8	8,967
Terminated Employees Entitled to But Not Yet Receiving Benefits	1,145	817	23	1,985
Active Employees				
Vested	2,402	2,377	415	5,194
Non-Vested	3	64	2,154	2,221
Total Membership	**8,524**	**7,243**	**2,600**	**18,367**

Closed Plan Description

Employees covered by the Closed Plan are fully vested for benefits upon receiving 5 years of creditable service. Under the Closed Plan, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 65 with 4 or more years of creditable service (active);
- Age 65 with 5 or more years of creditable service (terminated & vested);
- Age 60 with 15 or more years of creditable service (active or terminated & vested); or
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active or terminated & vested).

The following provisions apply for uniformed patrol members of the Closed Plan:

- Age 55 with 4 or more years of creditable service (active);
- Age 55 with 5 or more years of creditable service (terminated & vested);
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active or terminated & vested); or
- Mandatory retirement at age 60 (active).

All non-uniformed members may retire early, with reduced benefits, at age 55 with at least 10 years of creditable service.

The base benefit in the Closed Plan is equal to 1.6% multiplied by the final average pay multiplied by years of creditable service. For members of the uniformed patrol, the base benefit is calculated by applying the same formula, then multiplying the product by 1.333333.

Retired uniformed members will receive an additional benefit of $90 per month, plus cost-of-living adjustments (COLAs), until attainment of age 65. This payment, however, is reduced by any amount earned during gainful employment. This benefit is not available to uniformed members hired on or after January 1, 1995, or to vested deferred members.

For members employed prior to August 28, 1997, COLAs are provided annually based on 80% of the increase in the consumer price index for all urban consumers for the United States (CPI-U). The minimum rate is 4% and the maximum rate is 5%, until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated and the annual COLA rate will be equal to 80% of the

increase in the CPI-U (annual maximum of 5%). For members employed on or after August 28, 1997, COLAs are provided annually based on 80% of the increase in the CPI-U, up to a maximum rate of 5%.

The BackDROP is a payment option that is available to eligible members upon retirement. This option provides for a benefit to be calculated as if the member elected to retire at a previous date. If the BackDROP is elected, the monthly benefit payable on the actual retirement date is based on the benefit that would have been received by the member had he/she left employment and retired on the BackDROP date. In addition, the member will receive a lump sum payment equal to 90% of the life income annuity amount the member would have received during the BackDROP period. This lump sum amount includes any COLAs and other benefit increases; also, credit will be received for the unused sick leave balance as of the date of retirement.

The life income annuity payment option (which contains no provision for survivorship) and the life income with 60 or 120 month guaranteed payment options are available to all members. Joint and 50% or 100% survivor options are available if married at the time of retirement. In the Closed Plan, the reduction for the joint & 100% survivor option is based on the difference between the age of the member and the survivor. There is no reduction for the joint and 50% survivor option.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse as beneficiary if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect a payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving normal or work-related disability benefits, on or after September 28, 1985, are provided a $5,000 death benefit payable to designated beneficiaries.

Year 2000 Plan Description

Employees covered by the Year 2000 Plan are fully vested for benefits upon earning 5 years of creditable service. Under the Year 2000 Plan, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 62 and with 5 or more years of creditable service (active or terminated & vested);
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active).

The following provisions apply for uniformed patrol members of the Year 2000 Plan:

- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active);
- Mandatory retirement at age 60 (active only).

All members may retire early with reduced benefits at age 57 with at least 5 years of creditable service.

The base benefit in the Year 2000 Plan is equal to 1.7% multiplied by the final average pay multiplied by years of creditable service. Members retiring under the Rule of 80, and uniform patrol members retiring at the mandatory retirement age (currently 60), receive an additional temporary benefit until age 62. The temporary benefit is equivalent to 0.8% multiplied by final average pay multiplied by years of creditable service.

COLAs are provided annually based on 80% of the increase in the CPI-U, up to a maximum rate of 5%.

The BackDROP is a payment option that may be available to members upon retirement. This option provides for a monthly benefit to be calculated as if the member elected to retire at a previous date. If the BackDROP is elected, the monthly benefit payable on the actual retirement date is based on the benefit that would have been received by the member had he/she left employment and retired on the BackDROP date. In addition, the member will receive a lump sum payment equal to 90% of the life income annuity amount the member would have received during the BackDROP period. This lump sum amount includes any temporary benefits, COLAs and other benefit increases; also, credit will be received for the unused sick leave balance as of the date of retirement.

The life income annuity payment option (with no provision for survivorship) and the life income with 120 or 180 months guaranteed payment options are available to all members. Joint and 50% or 100% survivorship options are available if married at the time of retirement. The reduction for the joint and 50% or 100% survivor options is based on the member's age at retirement, as well as the age difference between the

member and the survivor.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse for survivor benefits if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect the payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving work-related disability benefits, on or after July 1, 2000, are provided a $5,000 death benefit payable to designated beneficiaries.

Year 2000 Plan-2011 Tier Description

Employees covered by the 2011 Tier are fully vested for benefits upon earning 5 years of creditable service if they were active on or after January 1, 2018. Under the 2011 Tier, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 67 and with 5 or more years of creditable service (active or terminated & vested);
- "Rule of 90" – at least age 55 with sum of member's age and service equaling 90 or more (active only).

Active MoDOT and civilian employees may retire early with reduced benefits at age 62 with at least 5 years of creditable service.

The following provisions apply for uniformed patrol members of the 2011 Tier:

- Age 55 and with 5 or more years of creditable service (active only);
- Mandatory retirement at age 60 with no minimum service amount (active only).

Terminated and vested uniformed patrol employees may retire at age 67 with 5 or more years of creditable service.

The base benefit in the 2011 Tier is equal to 1.7% multiplied by the final average pay multiplied by years of creditable service. Members retiring under the Rule of 90, and uniform patrol members retiring at the mandatory retirement age (currently 60) or at age 55 with 5 years of creditable service, receive an additional temporary benefit until age 62. The temporary benefit is equivalent to 0.8% multiplied by final average pay multiplied by years of creditable service.

COLAs are provided annually based on 80% of the change in the CPI-U, up to a maximum rate of 5%.

The life income annuity payment option (with no provision for survivorship) and the life income with 120 or 180 months guaranteed payment options are available to all members. Joint and 50% or 100% survivorship options are available if married at the time of retirement. The reduction for the joint and 50% or 100% survivor options is based on the member's age at retirement, as well as the age difference between the member and the survivor.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse for survivor benefits if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect the payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving work-related disability benefits, on or after January 1, 2011, are provided a $5,000 death benefit payable to designated beneficiaries.

Contributions

Beginning January 1, 2011, employee contributions of 4% of gross pay are required for those covered by the Year 2000 Plan-2011 Tier.

Employer contributions are determined through annual actuarial valuations. Administrative expenses are financed through contributions from participating employers and investment earnings.

Participating employers are required to make contributions to the plan based on the actuarially determined rate. Prior to August 13, 1976, contributions by all plan members were required. Accumulated employee contributions made prior to that time,

plus interest, were refunded to applicable members. Maximum contribution rates were eliminated August 13, 1976. Detailed information regarding contributions can be found in Note 5.

NOTE 3 – DEPOSITS AND INVESTMENTS

The Board of Trustees has established policies and procedures by which funds are invested. Section 104.150, RSMo., provides the authority for the Board to invest MPERS funds. Plan assets are invested in a diversified portfolio following prudent standards for preservation of capital, with the goal of achieving the highest possible rate of return consistent with MPERS' tolerance for risk. The Board of Trustees establishes MPERS' asset allocation policy, and may amend the policy. The following is MPERS' current asset allocation policy:

Asset Class	Target Allocation
Global Equity	30.0%
Private Equity	15.0%
Fixed Income	20.0%
Real Assets	7.5%
Real Estate	10.0%
Hedge Funds	10.0%
Opportunistic Debt	7.5%
Cash	0%

Note 3 (a) - Deposit and Investment Risk Policies

Concentration of Credit Risk

Concentration of credit risk is the risk of loss attributed to the magnitude of the System's investment in a single issuer. Within the traditional asset classes (equities and fixed income), the consultant will aggregate exposures across asset classes to create measures of concentration including industries, countries and security issuer for Investment staff review.

Investment Custodial Credit Risk

Custodial credit risk is an investment risk that, in the event of the failure of the counterparty to a transaction, the System will not be able to recover the value of its investment or the collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System, and are held by either: a) the counterparty or b) the counterparty's trust department or agent but not in the System's name. It is the policy of the System to require that all investments be clearly marked as to ownership and, to the extent possible, shall be registered in the name of the System.

Cash Deposit Custodial Credit Risk

Cash deposit custodial credit risk is the risk that, in the event of the failure of depository financial institution, the System will not be able to recover deposits or will not be able to recover collateral securities that are in the possession of an outside party. Missouri state law requires that all public funds must be collateralized with acceptable securities having fair values of at least 100% of the amount of funds on deposit (less any amount covered by FDIC insurance).

Market Risk

Market risk is the risk that the fair value of an investment will be adversely impacted due to a change in value of the underlying market. The three primary market risks prevalent in the System's investment portfolio are equity prices, interest rates, and foreign currencies. Equity risk is the risk that stock prices fall and/or the volatility in the equity market increases. Interest rate risk is the risk that fixed income securities (or any investment primarily valued on a yield basis) will drop in value due to an increase in interest rates. Currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The System protects the portfolio against market risks by adopting a diversified asset allocation that limits the amount of exposure to each underlying market risk. Market risks are also controlled by monitoring the types, amounts, and degree of risk that each investment manager takes for their specific mandate.

Investment Credit Risk

Investment credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. Unless authorized under a separate Investment Management Agreement or operating agreement, it is the policy of the System to limit fixed income managers to purchasing securities that possess a minimum credit rating of "Baa" by Moody's and "BBB" by Standard & Poor's. Issues subsequently downgraded below these ratings must be brought to the attention of the Chief Investment Officer. Where counterparty risk is present, the System's investment managers seek to control credit risk through counterparty credit evaluations and approvals, counterparty credit limits and exposure monitoring procedures.

Note 3 (b) - Cash Deposits

Cash balances include short-term securities held by the custodial bank to meet future obligations and operating balances held by the depository bank. As of June 30, 2018, MPERS had a carrying amount of deposits of ($137,891), and a bank balance of $137. The FDIC covered the bank

balances. To maximize investment income, cash is invested in overnight repurchase agreements, thus causing the negative cash amount disclosed above. The balances in these repurchase agreements at June 30, 2018 totaled $677,387. As of June 30, 2018, no investments were held as repurchase agreements that were uninsured or unregistered, with securities held by the counterparty or by its trust department or agent but not in MPERS' name.

Note 3 (c) – Concentrations

No investments in any one organization (other than those issued or sponsored by the U.S. government and those in pooled investments) represent 5% of plan net position.

Note 3 (d) – Rate of Return

For the year ended June 30, 2018, the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 9.45%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Note 3 (e) – Investments

The following table shows MPERS' investments by type.

Summary of Investments by Type at June 30, 2018

	Carrying Amount	Fair Value
Equities	$341,507,917	$470,017,822
Fixed Income	670,903,954	656,008,238
Limited Partnerships	911,393,303	981,543,412
Hedge	102,421,176	147,595,231
Short Term Securities	52,431,117	52,455,334
Securities Lending Collateral	133,616,408	133,616,408
Total Investments	$2,212,273,875	$2,441,236,445
Reconciliation to Statement of Fiduciary Net Position:		
Less: Repurchase Agreements		(677,387)
Less: Securities Lending Collateral		(133,616,408)
Investments per Statement of Fiduciary Net Position		**$2,306,942,650**

Certain investments are not listed on national exchanges, over-the-counter markets, nor do they have quoted market prices. Their valuation is based on the most current net asset values, independent appraisals, and/or good faith estimates of the investment's fair value provided by the general partner or portfolio manager, cash flow adjusted through fiscal year end. The estimated fair value of these investments may differ significantly from values that would have been used had a ready market existed. The following investments were priced using those methods and comprised 49% of the total fair value of the System's investments as of June 30, 2018:

Hedge Funds	147,595,231
Limited Partnerships	981,543,412
	$1,129,138,643

Note 3 (f) – Fair Value Measurements

MPERS categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (level 1 measurements) and the lowest priority to unobservable inputs (level 3 measurements).

Level 1: Unadjusted quoted prices for identical instruments in active markets.

Level 2: Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.

Level 3: Values derived from valuation techniques in which significant inputs are unobservable. Investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

Investments Measured at Fair Value, June 30, 2018

Investments by Fair Value Level	Fair Value	Level 1	Level 2	Level 3
Short Term Securities	$ 51,348,199	$ 51,348,199	$ 0	$ 0
Debt Securities				
Collateralized Debt Obligations	198,036,405	0	72,058,584	125,977,821
Commercial Mortgage-Backed Securities	38,856,126	0	38,856,126	0
Corporate Bonds	1,202,264	0	1,202,264	0
Government Commercial Mortgage-Backed Securities	13,442,192	0	1,488,279	11,953,913
Government Mortgage-Backed Securities	44,301,223	0	37,620,579	6,680,644
Municipal Bonds	186,266,807	0	177,952,607	8,314,200
U.S. Government Agencies	122,291,780	0	122,291,780	0
U.S. Treasury Securities	55,738,067	0	55,738,067	0
Total Debt Securities	660,134,863	0	507,208,286	152,926,577
Equity Securities				
Consumer Discretionary	5,506,050	5,506,050	0	0
Conumer Staples	1,281,098	1,281,098	0	0
Energy	68,163,792	68,163,792	0	0
Equity Other	50,910,935	50,910,935	0	0
Financials	44,759,252	44,088,248	671,004	0
Health Care	1,044,692	1,044,692	0	0
Industrials	7,082,695	7,082,695	0	0
Information Technology	3,947,220	3,947,220	0	0
Materials	648,716	648,716	0	0
Real Estate	13,636,777	13,636,777	0	0
Telecommunication Services	589,709	589,709	0	0
Utilities	426,055	426,055	0	0
Total Equity Securities	197,996,991	197,325,987	671,004	0
Private Markets				
Private Equity	369,745,317	0	0	369,745,317
Real Estate	97,659,278	0	0	97,659,278
Real Assets	256,324,056	0	0	256,324,056
Opportunistic Debt	188,086,676	0	0	188,086,676
Total Private Markets	911,815,327	0	0	911,815,327
Investment Derivative Instruments				
Equity Swaps	(2,387,100)	0	(2,387,100)	0
FX Forwards (assets)	751,213	0	751,213	0
FX Forwards (liabilities)	(78)	0	(78)	0
Total Investment Derivative Instruments	(1,635,965)	0	(1,635,965)	0
Total Investments by Fair Value Level	1,819,659,415	**$248,674,186**	**$506,243,325**	**$1,064,741,904**
Investments Measured at Net Asset Value				
Equity Long/Short	14,518,959			
Multi-Strategy	21,848,037			
In Liquidation	619,179			
Commodity Trading Advisors	8,833,223			
Activist Equity	29,983,817			
Event	13,617,625			
Fundamental Equity Market Nuetral	15,590,670			
Global Asset Allocation	30,780,122			
Structured Credit-Relative Value	11,803,599			
Commingled International Equity Funds	345,718,594			
Total Investments Measured at Net Asset Value	493,313,825			
Total Investments	**$2,312,973,240**			

Reconciliation to Statement of Fiduciary Net Position

Total Investments Measured at Fair Value and Derivatives	$2,312,973,240
Investment Sales Receivable	(6,843,573)
Investment Purchases Payable	7,057,400
Accrued Interest and Income	(6,383,098)
Accrued Expenses	138,681
Total Investments per Statement of Fiduciary Net Position	**$2,306,942,650**

Investments listed as level 1 include equity securities and futures contracts where the price comes from an exchange.

Investments listed as level 2 include debt securities where an independent pricing evaluator had direct observable information including: trading volume, multiple sources of market data and benchmark spreads. FX forwards are included due to the valuation coming from observable forward rates on the underlying currencies. The equity index swap is included because the valuation inputs include an observable interest rate and the underlying index.

Investments listed as level 3 include debt securities where an independent pricing evaluator did not have direct observable information and had limited market information for comparable securities. Significant inputs used in the valuation are not available aside from the evaluator providing the price. Direct investments in private equity, real estate, credit, and real assets are included because the valuation techniques utilize discounted cash flows or other non-observable market information by manager.

Investments Measured at Net Asset Value, June 30, 2018

Investments by Fair Value Level	**Fair Value**	**Unfunded Commitments**	**Redemption Frequency (If Currently Eligible)**	**Redemption Notice Period**
Hedge Funds				
Equity Long/Short	$ 14,518,959	$ 0	Quarterly	45 Days
Multi-Strategy	21,848,037	0	Quarterly	60-90 Days
In Liquidation	619,179	0	n/a	n/a
Commodity Trading Advisors	8,833,223	0	Monthly	30 Days
Activist Equity	29,983,817	0	Yearly, Every 3 Years	90 Days
Event	13,617,625	0	Monthly	90 Days
Fundamental Equity Market Neutral	15,590,670	0	Monthly	90 Days
Global Asset Allocation	30,780,122	0	Monthly	5-60 Days
Structured Credit - Relative Value	11,803,599	0	Quarterly	60 Days
Total Hedge Funds	147,595,231	0		
Commingled International Equity Funds	240,669,843	0	Daily, Monthly	0-30 Days
Commingled International Equity Funds	105,048,751	0	Daily	90 Days
Total Commingled International Equity Funds	345,718,594	0		
Total Investments at Net Asset Value	**$493,313,825**	**$ 0**		
Private Markets				
Private Equity	$ 369,745,317	$111,409,163		
Real Estate	97,659,278	109,971,670		
Real Assets	256,324,056	95,104,227		
Opportunistic Debt	188,086,676	89,752,990		
Total Private Markets	$ 911,815,327	$406,238,050		

Hedge Funds

Equity Long/Short: Consisting of one fund, this strategy invests in both long and short in Asia Pacific equity securities, with a goal of adding growth and minimizing market exposure. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next six months.

Multi-Strategy: The two funds that make up this group aim to pursue varying strategies in order to diversify risks and reduce volatility. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next six months.

Hedge Funds in Liquidation: MPERS currently has a small investment in two hedge funds that are in liquidation. These funds have closed and MPERS is awaiting the sale of final assets.

Commodity Trading Advisors: MPERS currently has one fund focusing on a systematic strategy that follows medium-term trends. The value of this investment is eligible for redemption in the next two months.

Activist Equity: Consisting of two funds, this strategy focuses on obtaining publicly traded shares of companies and effecting changes within the companies that it owns whether that be value creation through operational, financial or corporate governance changes. One fund's focus is on North American companies and the other fund's focus is on European and Nordic companies. Due to contractual lock-up restrictions and the necessity for activist managers to retain capital in order to realize the desired company changes, 50% of this strategy's investments are eligible for redemption on a rolling three-year basis. The remaining 50% are eligible for redemption on a rolling one-year basis.

Event Driven: Consisting of one fund, this strategy seeks to gain an advantage from pricing inefficiencies that may occur at the onset or aftermath of a merger, corporate action or related event. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next four months.

Fundamental Equity Market Neutral: Consisting of one fund, this strategy invests in both long/short equities capturing price differences and seeks to maintain a neutral exposure to the market by having no sector, industry, market capitalization, or country biases. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next four months.

Global Asset Allocation: Consisting of one fund, this strategy is highly diversified and uses fundamental research to develop systematic rules for trading positions. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next 35 days.

Structural Credit Relative Value: Consisting of one fund, this strategy's main focus is to benefit from valuation discrepancies that may be present in related financial instruments by simultaneously purchasing or selling these instruments. Due to contractual lock-up restrictions, all funds are eligible for redemption within the next six months.

Commingled International Equity Funds

MPERS invests in three international equity funds that are considered to be commingled in nature. Due to contractual lock-up restrictions, 70% of this capital is eligible for redemption in one month; the remaining 30% has daily liquidity.

Private Markets

Private equity, real estate, real assets and opportunistic debt are the four asset classes that fall into the category of private market funds. These funds invest in the equity or debt of private companies.

Private Equity: The private equity portfolio includes 19 direct fund investments and two fund of fund investments. These funds invest in private companies adding value through operational or industry expertise and vast networks. The majority of the private equity allocation is in buyout funds with a smaller portion in venture capital funds. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of six to ten years.

Real Estate: The real estate portfolio consists of 20 real estate funds. The noncore real estate book includes 17 real estate funds and invests in value-add or opportunistic strategies. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of six to ten years. The remaining three investments are in core real estate funds. These funds are open-ended and are eligible for redemption on a daily basis.

Real Assets: The real asset portfolio contains 22 funds that invest in private energy, aviation, mining and shipping companies. The timber portfolio, which includes both ownership in timber funds and direct timber investments, is also within the real assets portfolio. The timber portfolio has 10 direct timber investments. These funds and investments are not eligible for redemption. Distributions are received as underlying investments and investments within the funds are liquidated, which on average can occur over the span of six to ten years.

Opportunistic Debt: The opportunistic debt portfolio, comprised of 24 funds, provide financing to private companies. While this portfolio has a U.S. bias, some funds invest internationally with exposures in Europe and Asia. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of three to five years.

Note 3 (g) – Investment Interest Rate Risk

The following table summarizes the maturities of government obligations, corporate bonds, convertible corporate bonds, mortgages, and asset-backed securities which are exposed to interest rate risk.

Summary of Weighted Average Maturities at June 30, 2018

Investment Type	Fair Value	Investment Maturities (in years) less than 1	1 - 5	6 - 10	more than 10
Asset-Backed Securities	$207,670,958	$0	$12,500,856	$42,122,916	$153,047,186
Commercial Mortgage-Backed Securities	25,455,642	0	495,297	0	24,960,345
Corporate Bonds	8,720,277	0	45,892	0	8,674,385
Government Agencies	110,130,922	0	2,315,921	14,777,634	93,037,367
Government Bonds	46,971,373	0	0	0	46,971,373
Government Mortgage-Backed Securities	28,162,644	0	921,757	454,140	26,786,747
Government-issued Commercial Mortgage-Backed	3,737,155	0	577,263	0	3,159,892
Index Linked Govt Bonds	34,913,353	0	16,244,783	7,841,663	10,826,907
Municipal/Provincial Bonds	174,926,678	0	2,908,857	30,393,019	141,624,802
Non-Govt Backed C.M.O.s	14,341,734	0	0	0	14,341,734
Fixed Income Bank Loans	977,500	0	0	977,500	0
Short Term Bills and Notes	7,452,728	7,452,728	0	0	0
Total	**$663,460,964**	$7,452,728	$36,010,626	$96,566,872	$523,430,738

Note 3 (h) – Investment Credit Ratings

The following table summarizes the credit ratings of the government obligations, corporate bonds, mortgages, and asset-backed securities.

Summary of Credit Ratings at June 30, 2018

Investment Type	AAA	AA	A	BBB	BB	B	CCC	CC	D	Not Rated	US Govt Guar	Total
Asset Backed Securities	$34,898,635	$49,672,687	$15,052,100		$5,977,747					$102,069,789		$207,670,958
Commercial Mortgage-Backed	8,566,525									16,431,428	457,689	25,455,642
Corporate Bonds		1,119,580		188,811						7,368,316		8,676,707
Corporate Convertible Bonds										43,570		43,570
Government Agencies		99,683,171									10,447,751	110,130,922
Government Bonds											46,971,373	46,971,373
Government Mortgage Backed Securities										738,120	27,424,524	28,162,644
Gov't-issued Commercial Mortgage-Backed											3,737,155	3,737,155
Index Linked Government Bonds											34,913,353	34,913,353
Municipal/Provincial Bonds	61,896,861	91,108,098	2,044,314							19,877,405		174,926,678
Non-Government Backed C.M.O.s		138,966	444,198	210,408	105,915	366,732	625,770	305,852	899,085	11,244,808		14,341,734
Fixed Income Bank Loans										977,500		977,500
Short Term Bills and Notes											7,452,728	7,452,728
Total	**$105,362,021**	**$241,722,502**	**$17,540,612**	**$399,219**	**$6,083,662**	**$366,732**	**$625,770**	**$305,852**	**$899,085**	**$158,750,936**	**$131,404,573**	**$663,460,964**

Note 3 (i) – Investment Foreign Currency Risk

Currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The following table summarizes MPERS' exposure to foreign currencies for all assets that are held in custody at the System's custodial bank. MPERS' has exposure to foreign currencies in other areas of the portfolio, such as commingled international funds, hedge funds and private partnerships, which are held in the custody of other banks acting as administrators for the funds.

Exposure to Foreign Currency Risk As of June 30, 2018

Foreign Currency	Equities	Real Estate / Partnerships	Total
Australian Dollar	$ 820,941	$ 0	$ 820,941
British Pound Sterling	958,437	10,400,386	11,358,823
Canadian Dollar	262,519	0	262,519
Euro	1,337,479	21,539,154	22,876,633
Hong Kong Dollar	867,351	0	867,351
Japanese Yen	1,632,030	0	1,632,030
Norwegian Krone	85,436	0	85,436
Singapore Dollar	444,696	0	444,696
Swedish Krona	519,464	0	519,464
Total Exposure Risk	**$6,928,353**	**$31,939,540**	**$38,867,893**

Note 3 (j) – Securities Lending

In accordance with the Board of Trustees' investment policy, MPERS participates in a securities lending program. The Northern Trust Company administers the program. There are no restrictions on the amount of securities that may be lent.

Securities that may be loaned include U.S. government and agency securities, corporate equity, and fixed income securities. Collateral may include cash, U.S. government securities and irrevocable letters of credit. U.S. securities are loaned in exchange for collateral valued at 102% of the fair value of the securities, plus any accrued interest. Non-U.S. securities are loaned in exchange for collateral valued at 105% of the fair value of the securities, plus any accrued interest. On June 30, 2018, MPERS had no credit risk exposure to borrowers, since the amount of collateral exceeded the amount of the loans.

Non-cash collateral cannot be pledged or sold unless the borrower defaults. The average term of the System's loans was approximately 118 days as of June 30, 2018. Cash open collateral is invested in a short-term investment pool, which had an interest sensitivity of 29 days as of June 30, 2018. Cash collateral may also be invested separately in "term loans", in which case the investments match the loan term. These loans can be terminated on demand by either lender or borrower. There were no known violations of legal or contractual provisions, or borrower or lending agent default losses. There were no dividends or coupon payments owing on the securities lent. Securities lending earnings are credited on approximately the fifteenth day of the following month.

Indemnification deals with a situation in which a client's securities would not be returned due to the insolvency of a borrower and Northern Trust would fail to live up to its contractual responsibilities relating to the lending of those securities. Northern Trust's responsibilities include performing appropriate borrower and collateral investment credit analyses and demanding adequate types and levels of collateral.

The collateral held (including both cash collateral recognized in the Statement of Fiduciary Net Position and non-cash collateral) is:

Collateral Held As of June 30, 2018

Investment Type	
Equities	$ 76,637,366
Government & government sponsored securities	62,203,491
Total	**$138,840,857**

Note 3 (k) – Derivatives

A derivative financial instrument is an investment whose value depends on the values of one or more underlying assets, financial indexes, or commodity prices. These investments include futures contracts, options contracts, and forward foreign currency exchange. Derivative financial instruments involve credit risk and market risk, as described in Note 3 (a), in varying levels.

Through MPERS' external managers, MPERS holds investments in futures contracts, swap contracts, options contracts, and forward foreign currency exchange contracts. MPERS enters futures and swaps contracts to gain exposure to certain markets and enters into forward foreign exchange contracts primarily to hedge foreign currency exposure.

The notional value related to these derivative instruments is generally not recorded on the financial statements; however, the change in fair value of these instruments is incorporated in performance. The notional/fair value of $263,770,311 for the various contracts in MPERS' portfolio as of June 30, 2018, is recorded in investments on the Statement of Fiduciary Net Position. The change in fair value of ($973,308) for the year ended June 30, 2018, is recorded in investment income on the Statement of Changes in Fiduciary Net Position.

Investment Derivatives As of June 30, 2018

Type	Classification	Notional/ Fair Value	Unrealized Gain (Loss)
Futures Contracts	Investments, at fair value	$193,829,266	($415,381)
Swap Contracts	Investments, at fair value	89,654,390	(142,547)
Foreign Currency Forward Contracts	Investments, at fair value	(19,713,345)	(415,380)
Total		**$263,770,311**	**($973,308)**

Through the use of derivatives, MPERS is exposed to risk that the counterparties involved in the contracts are unable to meet the terms of their obligation. MPERS' investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. MPERS anticipates the counterparties will be able to satisfy their obligations under the contracts. The associated counterparty's credit rating is an A-.

NOTE 4 – RECEIVABLES

Receivables As of June 30, 2018

Type	**Total**
Contributions-MoDOT	$5,355,406
Contributions-MSHP Non-Uniformed	1,166,334
Contributions-MSHP Uniformed	1,967,305
Contributions-Retirement System	197,581
Investment Interest & Income	6,383,098
Investment Sales	6,843,573
Total	**$21,913,297**

NOTE 5 – CONTRIBUTIONS

MoDOT, MSHP, and MPERS make contributions to the System, as do employees covered under the Year 2000 Plan-2011 Tier. MPERS permanent funding policy provides for actuarially determined employer contributions using the entry-age normal cost method on a closed group basis (consisting of normal cost and amortization of any unfunded accrued liabilities over a 30-year period, beginning July 1, 2006). (The objective is to reduce the period by one year each year.) A temporary accelerated policy has been adopted where the total contribution is based on entry-age normal cost plus a 15-year amortization period for unfunded retiree liabilities and a 30-year amortization period for other unfunded liabilities. Both amortization periods are closed periods starting July 1, 2010. This temporary accelerated policy was adopted by the MPERS' Board of Trustees on September 17, 2009, and will remain in effect until such time as the retiree liability becomes 100% funded or the permanent policy produces a higher contribution rate. Actuarially determined rates, expressed as percentages of annual covered payroll, provide for amounts sufficient to fund those benefits designated by state statute to be funded in advance. Actuarial assumptions used to compute contribution requirements are the same as those used to compute the pension benefit obligation. The employee contribution rate for members of the Year 2000 Plan-2011 Tier is set by statute.

Required employer contributions totaling $204,955,180 for fiscal year 2018, represent funding of normal costs and amortization of the unfunded accrued liability. Actual contributions made were 100% of required contributions. Contribution rates as determined by the System's actuary for the year ended June 30, 2018, are shown in the following table. The Board established actual rates to be the same as the actuarially determined rates.

Contribution Rates

MoDOT, MPERS & Civilian Patrol	**Uniformed Patrol**	**2011 Tier Employee**
58.00%	58.00%	4.00%

At the September 26, 2014 Board meeting, the Board adopted the use of a contribution rate stabilization reserve that would result in an MPERS employer contribution rate similar to the fiscal year 2015 rates. The reserve is intended to keep the contribution relatively level over time and may be used if the investment market experiences a downturn in the future. The Board further adopted (in February 2015) that the employer contribution rate would not fall below 58% unless 1) the fund became fully funded or 2) the contribution stabilization reserve reached $250 million. The balance of the reserve as of June 30, 2018, was $157,556,374.

NOTE 6 – DEFERRED RETIREMENT OPTION PROGRAM

MPERS currently provides a BackDROP option. This is an election made at the time of actual retirement. In effect, it provides members an option to elect to receive a portion of their benefits as cash. Since the election is not made until the member actually retires, the option is not treated as a DROP provision in accordance with generally accepted accounting principles.

NOTE 7 – NET PENSION LIABILITY OF EMPLOYERS

The components of the net pension liability of the employers at June 30, 2018, were as follows:

Total pension liability	$3,981,838,941
Plan fiduciary net position	(2,314,530,148)
Employers' net pension liability	$1,667,308,793

Plan fiduciary net position as a percentage of the total pension liability	58.13%
Covered Employee Payroll	$353,751,292
Employers' net pension liability as a percentage of covered payroll	471.32%

Actuarial Assumptions

The total pension liability amounts were determined by actuarial valuations as of June 30, 2018, using the following actuarial assumptions, applied to all prior periods included in the measurement:

Inflation	3.0%
Salary Increases	3.0% to 12.45%
Investment Rate of Return	7.00%

The Board formally adopted these new assumptions based on the July 1, 2012 through June 30, 2017 experience study, effective for the June 30, 2018 valuation. The significant change to note is a decrease in the investment rate of return from 7.75% to 7.00%. Salary increases expanded by just under 2% going from a range of 3.5% - 11% to 3% - 12.45% and inflation remained the same.

The mortality tables, for post-retirement mortality, used in evaluating allowances to be paid to non-disabled pensioners were the RP-2014 Healthy Mortality Tables projected to 2022 using projection scale MP-2017. Pre-retirement mortality used were the RP-2014 Employee Mortality Table projected to 2022 using projection scale MP-2017 and multiplied by a factor of 65%. Disabled pension mortality was based on RP-2014 Disabled Retiree Annuitant Mortality Tables projected to 2022 using projection scale MP-2017.

The long-term (30 year) expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return were adopted by the plan's trustees after considering input from the plan's investment consultants and actuary. These estimates for each major asset class included in MPERS' target asset allocation as of June 30, 2018, (see Note 3) are summarized in the following table:

Asset Class	Long-Term Expected Real Rate of Return
Global Equity	4.75%
Private Equity	6.50%
Fixed Income	0.25%
Opportunistic Debt	4.00%
Real Assets	4.75%
Real Estate	2.75%
Hedge Funds	2.75%

Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.00%. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. The employers pay the same contribution rate for each employee regardless of the plan the employee was hired under. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to

make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability to changes in the single discount rate, the following presents the plan's June 30, 2018 net pension liability, calculated using a single discount rate of 7.00%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

Current Single Discount

	1% Decrease 6.0%	Rate Assumption 7.0%	1% Increase 8.0%
Net Pension Liability	$2,140,629,340	$1,667,308,793	$1,272,455,084

NOTE 8 – EMPLOYER PROPORTIONATE SHARE

MPERS, as the administrative agent for the pension system, is also an employer of the pension system. The administrative expenses of the pension system are included in the deductions to the pension system's fiduciary net position. While the employer contributions of the other participating employers are funded from outside revenue sources, the employer contributions of MPERS are funded from sources already recognized as revenues, such as earnings on plan investments or contributions paid by the other participating employers. Attempting to allocate a portion of the net pension liability to MPERS as an employer would result in an allocation of the net pension liability to the other participating employers. Accordingly, MPERS excludes its contributions from the employer proportionate share calculation for the reporting of a net pension liability, by assigning itself a proportionate share of 0%. This exclusion, in essence, shifts the portion of the net pension liability that would accrue to MPERS to the other participating employers.

NOTE 9 – PERSONAL SERVICES AND RETIREMENT PLAN

MPERS employed 16 full-time employees and 1 part-time employee on June 30, 2018. Ten former MPERS employees have retired. Full-time employees are members of the System (see Note 8). For these employees, MPERS accrued 58.00% of payroll during fiscal year 2018, amounting to $1,127,506. The amounts for fiscal year 2018 and the three preceding years are shown below. These amounts are recorded as both a contribution and administrative expense. Information regarding the retirement plans can be found in Notes 2 and 5.

Net Obligations

Year Ended June 30	Annual Contribution Accrual	
	Percent	Dollars
2015	58.76	907,064
2016	58.05	996,378
2017	58.00	1,087,268
2018	58.00	1,127,506

NOTE 10 – OTHER POST-EMPLOYMENT BENEFITS (OPEB)

In addition to the retirement benefits described previously, MPERS provides a portion of health care insurance through the MoDOT and MSHP Medical and Life Insurance Plan (Insurance Plan) in accordance with Missouri State statutes. The Insurance Plan is considered an agent multiple-employer defined benefit plan and is administered by MoDOT. The Insurance Plan is financed on a pay-as-you-go basis and is an internal service fund of MoDOT. At June 30, 2018, there were 8 inactive (retired) members and 16 active employees participating in the Insurance Plan.

Medical insurance benefits are established by the Insurance Plan's Board of Trustees and are approved by the Missouri Highways and Transportation Commission. Benefits include general inpatient and outpatient medical services; mental, nervous and substance abuse care; and prescriptions. Eligible members are employees who retired from the System with a minimum of 5 years of service and who participate in the Insurance Plan.

MoDOT issues a publicly available financial report that includes financial statements and required supplementary information for the Insurance Plan. Requests for this report should be addressed to MoDOT, Financial Services Division, P.O. Box 270, Jefferson City, MO 65102.

Employer and member contributions are established by the Insurance Plan's Board of Trustees and are approved by the Missouri Highways and Transportation Commission. Premiums vary by coverage categories, which include retirees, certain disabled employees, spouses, certain dependents, and survivors of deceased employees and retirees.

Changes in Total OPEB Liability
MPERS' proportionate share (0.14%) of the Insurance Plan's net OPEB liability is $1,545,180 which was measured as of July 1, 2017 and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date.

Summary of Changes in Net OPEB Liability for the Year Ended June 30, 2018

	Total
Beginning Balance	$1,689,435
Changes for the year:	
Service Cost	81,000
Interest Cost	49,929
Changes of benefit terms	---
Differences between expected and actual experience	---
Changes in assumptions	(238,129)
Benefit payments	(37,055)
Net changes	(144,255)
Balance at June 30, 2018	$1,545,180

Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB
For the year ended June 30, 2018, MPERS recognized net OPEB expense of $92,019. MPERS reported deferred outflows of resources and deferred inflows of resources related to OPEB from the following sources:

Defarred Outflows / Inflows

	Deferred Outflows	**Deferred Inflows**
Changes of assumptions or other inputs	$ 0	($199,219)
Contributions subsequent to measurement date	34,090	0
Total	$34,090	($199,219)

Deferred outflows resulting from contributions subsequent to the measurement date will be recognized as a change to the net pension liability in each subsequent year. Other deferred amounts related to OPEB will be recognized in expenses as follows:

Amortization of Deferred Inflows/Outflows

Fiscal year	Deferred Outflows	Deferred Inflows
2019	$0	($38,910)
2020	0	(38,910)
2021	0	(38,910)
2022	0	(38,910)
2023	0	(38,910)
Total Thereafter	0	(4,669)

Actuarial Assumptions
The following actuarial assumptions and other inputs, applied to all periods included in the measurement:

Actuarial Methods and Assumptions

Cost method	Entry Age Normal based upon salary
Inflation	2.00%
Salary increases	2.50%
Discount rate	3.58%
Investment rate of return	n/a; the plan is unfunded
Health care cost trend rates	8.4%, decreasing to 4.9% in 2025
Retirees' share of benefit-related costs	43% - 60%
Admin Expense Trend (Inflation) Rate	4%

- The inflation rate was based on the actuary's long-term estimate of inflation as of July 1, 2017.
- The salary increases were based on projected salaries, which include COLAs, provided by MoDOT.
- The discount rate was based on Bond Buyer General Obligation 20-Bond Municipal Bond Index.
- Mortality rates were based on the RP 2014 Employees and Health Annuitants Mortality table, headcount weighted, fully generational projected by Scale MP-2016.
- The actuarial assumptions used in the June 30, 2017 valuation were based on the results of an actuarial experience study for the period July 1, 2016-June 30, 2017.
- It is assumed the current employer and member contributions will continue as approved by the Commission.

Changes of assumptions and other inputs reflect a change in the discount rate from 2.85 percent in 2017 to 3.58 percent in 2018.

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability as of June 30, 2018:

	1% Decrease	Current Discount Rate	1% Increase
Net OPEB Liability	$1,884,246	$1,545,180	$1,285,951

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability as of June 30, 2018:

	1% Decrease	Current Discount Rate	1% Increase
Net OPEB Liability	$1,252,599	$1,545,180	$1,938,914

NOTE 11 – CAPITAL ASSETS

Summary of Changes in Capital Assets

	6/30/2016 Balance	Additions	Deletions/ Retirements	6/30/2017 Balance
Land	$84,000	$0	$0	$84,000
Building	581,619	0	0	581,619
Furniture, Equipment and Software	3,514,780	0	(10,562)	3,504,218
Less: Accumulated Depreciation	(2,976,082)	(345,771)	10,562	(3,311,291)
Total	**$1,204,317**	**($345,771)**	**$0**	**$858,546**

NOTE 12 – RISK MANAGEMENT

MPERS is exposed to various risks of loss related to natural disasters, asset theft or damage, errors and omissions, torts, and employee injuries.
MPERS has purchased commercial insurance related to capital asset loss and damage. Ancillary coverage provided through the property policy includes coverage for accounts receivable, loss of money and securities, employee dishonesty, and forgery and alterations. MPERS carries a $2 million umbrella liability policy. MPERS has coverage through Missouri Highway and Transportation Commission's Self-Insurance Fund related to workers' compensation. MPERS' has also purchased a directors and officers liability policy with $1 million aggregate coverage. This coverage is inclusive of legal defense costs and carries a $35,000 deductible. The State's Legal Expense Fund covers all state employees and officers, and MPERS has purchased surety bonds for the executive director and staff. Settlements have not exceeded coverages for each of the past three fiscal years.

MPERS has a disaster recovery plan that provides for continued computer operations at a remote location should the retirement office be unavailable for normal operations.

Required Supplementary Information

Schedule Of Changes in The Employers' Net Pension Liability
As of June 30,

	2018	2017	2016	2015	2014	2013
Total Pension Liability						
Service Cost	$ 46,621,377	$ 45,713,403	$ 45,441,305	$ 45,358,095	$ 44,739,603	$ 44,446,279
Interest on the Total Pension Liability	286,457,436	283,568,441	280,432,068	275,284,910	270,525,608	265,339,848
Benefit Changes	(7,684)	0	0	0	0	0
Difference Between Expected and Actual Experience	(37,173,164)	(37,286,966)	(39,810,009)	(13,324,219)	(17,614,321)	(13,690,794)
Assumption Change	142,556,109	0	0	0	0	204,396,180
Benefit Payments	(254,131,209)	(246,617,775)	(236,488,629)	(236,905,323)	(227,958,108)	(220,623,394)
Refunds	(503,007)	(321,328)	(198,106)	(107,395)	(18,686)	(29,300)
Disability Premiums	(1,601,605)	(1,620,418)	(1,567,825)	(1,554,676)	(1,531,578)	(1,512,685)
Transfers to Other Retirement Systems	(2,823,042)	(2,724,631)	(1,921,451)	(3,147,482)	(1,876,336)	(629,246)
Net Change in Total Pension Liability	**179,395,211**	**40,710,726**	**45,887,353**	**65,603,910**	**66,266,182**	**277,696,888**
Total Pension Liability - Beginning	**3,802,443,730**	**3,761,733,004**	**3,715,845,651**	**3,650,241,741**	**3,583,975,559**	**3,306,278,671**
Total Pension Liability - Ending (a)	**$ 3,981,838,941**	**$3,802,443,730**	**$3,761,733,004**	**$3,715,845,651**	**$3,650,241,741**	**$3,583,975,559**
Plan Fiduciary Net Position						
Contributions - Employer	$ 204,955,180	$ 206,562,924	$ 199,609,396	$ 200,638,571	$ 183,353,841	$ 170,836,117
Contributions - Employee	5,001,418	4,891,932	3,482,513	3,294,162	2,260,563	1,139,450
Pension Plan Net Investment Income	197,619,838	220,301,741	21,432,095	92,645,571	319,445,780	198,141,088
Benefit Payments	(254,131,209)	(246,617,775)	(236,488,629)	(236,905,323)	(227,958,108)	(220,619,035)
Refunds	(503,007)	(321,328)	(198,106)	(107,395)	(18,686)	(29,300)
Disabilty Premiums	(1,601,605)	(1,620,418)	(1,567,825)	(1,554,676)	(1,531,578)	(1,512,685)
Pension Plan Administrative Expense	(4,693,492)	(4,515,458)	(4,370,860)	(4,066,944)	(3,736,355)	(2,997,225)
Net Transfers	(955,597)	(980,524)	808,228	(2,033,045)	(91,954)	(629,246)
Net Change in Plan Fiduciary Net Position	**145,691,526**	**177,701,094**	**(17,293,188)**	**51,910,921**	**271,723,503**	**144,329,164**
Plan Fiduciary Net Position - Beginning	**2,168,838,622**	**1,992,073,946**	**2,009,367,134**	**1,957,456,213**	**1,685,732,710**	**1,541,403,546**
Plan Fiduciary Net Position - Ending (b)	**$ 2,314,530,148**	**$ 2,169,775,040**	**$1,992,073,946**	**$2,009,367,134**	**$ 1,957,456,213**	**$1,685,732,710**
Adjustment - GASB 75 Implementation		**(936,418)**				
Plan Fiduciary Net Position - Ending as Restated		**$2,168,838,622**				
Employers' Net Pension Liability - Ending (a) - (b)	**$ 1,667,308,793**	**$ 1,632,668,690**	**$1,769,659,058**	**$1,706,478,517**	**$ 1,692,785,528**	**$1,898,242,849**
Plan Fiduciary Net Position as a % of Total Pension Liability	58.13%	57.06%	52.96%	54.08%	53.63%	47.04%
Covered Payroll	$ 353,751,292	$ 356,515,416	$ 344,635,441	$ 342,264,593	$ 336,590,797	$ 323,205,767
Employers' Net Pension Liability as a % of Covered Payroll	471.32%	457.95%	513.49%	498.58%	502.92%	587.32%

Note: These schedules are intended to present information for 10 years, but may be built prospectively. Additional years will be displayed as they become available.

Required Supplementary Information

Schedule Of Employers' Contributions
Last 10 Fiscal Years

	Actuarially Determined Contributions	Actual Contributions	Contribution Deficiency (Excess)	Covered Employee Payroll	Contributions as a Percentage of Employee Covered Payroll
2009	$122,613,975	$122,613,975	$0	$379,140,306	32.34%
2010	124,052,534	124,052,534	0	376,258,823	32.97
2011	149,952,750	149,952,750	0	363,345,651	41.27
2012	164,884,467	164,884,467	0	344,514,139	47.86
2013	170,836,117	170,836,117	0	329,863,134	51.79
2014	183,353,841	183,353,841	0	336,799,855	54.44
2015	200,638,571	200,638,571	0	342,211,446	58.63
2016	199,609,396	199,609,396	0	344,154,131	58.00
2017	206,562,924	206,562,924	0	356,142,972	58.00
2018	204,955,180	204,955,180	0	353,371,000	58.00

Schedule Of Investment Returns
Last 10 Fiscal Years

Fiscal Year Ended June 30	Annual Money-Weighted Rate of Return
2009	-24.88%
2010	12.72%
2011	21.57%
2012	2.80%
2013	13.37%
2014	17.58%
2015	6.62%
2016	1.02%
2017	11.22%
2018	9.45%

Notes To Required Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation Date .... June 30, 2018
Actuarial Cost Method .... Entry Age
Amortized Method .... Level Percentage of Payroll, Closed
Remaining Amortization Period .... 14 Years (single equivalent period)
Asset Valuation Method .... 3-Year Smoothed Market: 20% Corridor
Inflation .... 2.25% (price inflation)
Actuarial Assumptions:
  Investment Rate of Return 7.0%
  Projected Salary Increase .... 3.0% to 12.45% (including 3.0% wage inflation)
  Cost-of-Living Adjustments .... 1.8% Compound

Other Post-Employment Benefit (OPEB) Plan
Schedule of Changes in Net OPEB Liability and Related Ratios for MoDOT and MSHP Medical and Life Insurance Plan

Total OPEB Liability	**2018**
Service Cost	$ 81,000
Interest Cost	49,929
Changes of benefit terms	0
Differences between expected and actual experience	0
Changes in assumptions	(238,129)
Benefit payments	(37,055)
Net Change in total OPEB Liability	**(144,255)**
Total OPEB Liability (Beginning)	**1,689,435**
Total OPEB Liability (Ending)	**$1,545,180**
Plan Fiduciary Net Position	
Contributions	$ 37,055
Benefit Payments	(37,055)
Net Change in Plan Fiduciary Net Position	**0**
Plan Fiduciary Net Position (Beginning)	**0**
Plan Fiduciary Net Position (Ending)	**$ 0**
Net OPEB Liability (Ending)	$ 1,545,180
Net Position as a Percentage of OPEB Liability	N/A
Covered-Employee Payroll	$ 790,000
Net OPEB Liability as a Percentage of Payroll	195.59%

Other Post-Employment Benefit (OPEB) Plan
Schedule of MPERS' Proportionate Share of Net OPEB Liability for MoDOT and MSHP Medical and Life Insurance Plan

Year Ended June 30	Proportion of Net OPEB Liability	Proportionate Share of Net OPEB Liability	Covered Employee Payroll	Net OPEB Liability as % of Covered Employee Payroll	Net Position as % of Total OPEB Liability
2018	0.14%	$1,545,180	$790,000	195.59%	N/A

Note: These schedules are intended to present information for 10 years, but may be built prospectively. Additional years will be displayed as they become available.

Schedule Of Administrative Expenses

For the Year Ended June 30, 2018

Personnel Services:	
Salary Expense	$1,997,282
Employee Benefit Expense	1,522,818
Total Personnel Services	**3,520,100**
Professional Services:	
Actuarial Services	82,052
Audit Services	46,700
Legislative Consultant	30,000
Investment Special Consulting	15,000
Insurance Consultant	6,000
Other Consultant Fees	29,424
Fiduciary Insurance	19,507
IT Hosting and Support	279,900
Other	17,671
Total Professional Services	**526,254**
Miscellaneous:	
Depreciation	345,772
Meetings/Travel/Education	89,265
Equipment/Supplies	74,228
Printing/Postage	32,881
Bank Service Charge	9,093
Building Expenses	33,884
Other	62,015
Total Miscellaneous	**647,138**
Total Administrative Expenses	**$4,693,492**

Supplementary Information

Schedule Of Investment Expenses

For the Year Ended June 30, 2018

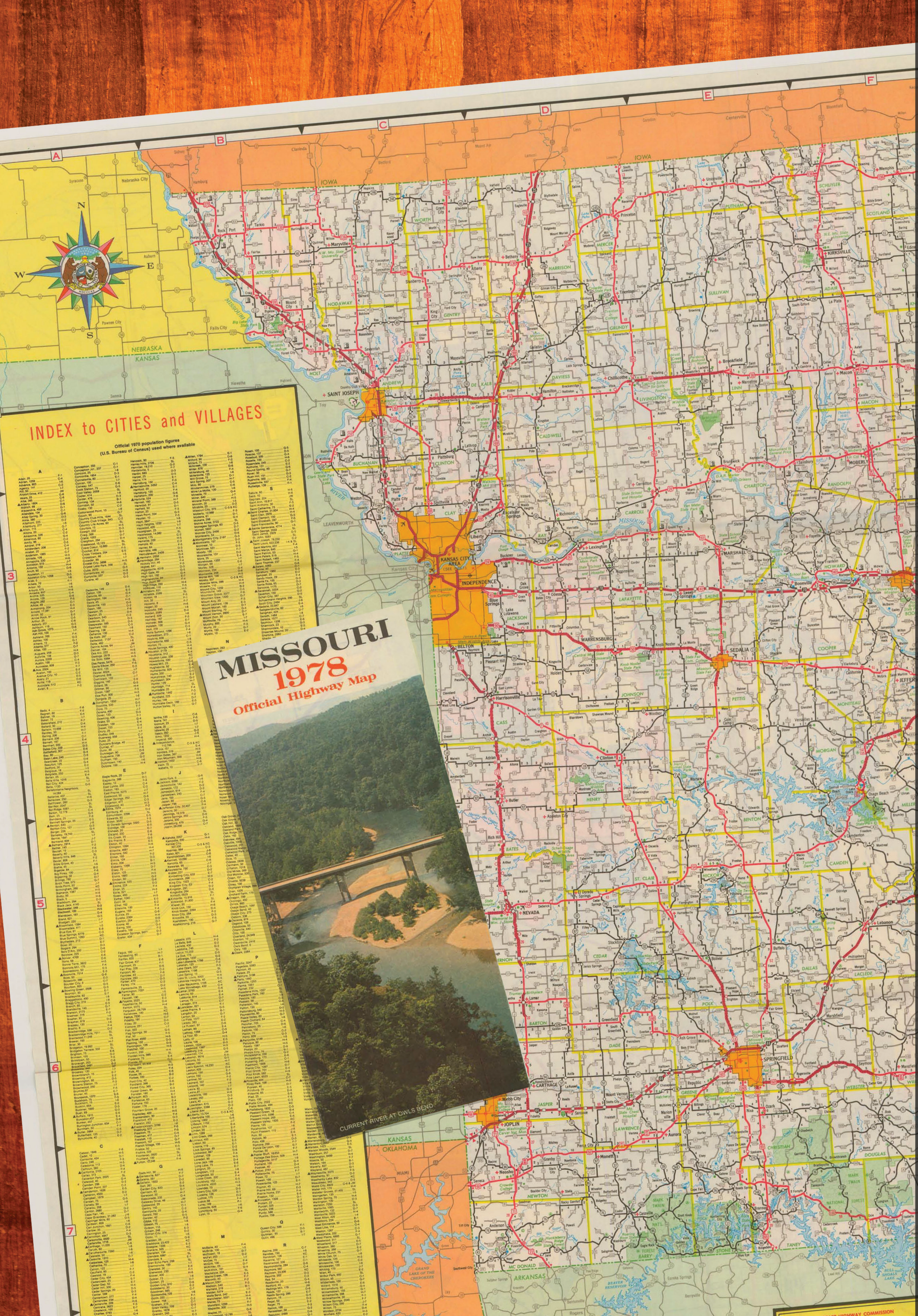
Investment Income Expenses:	
Management and Performance Fees	
Management and Performance Fees by Asset Class	
Equities	$ 2,881,024
Fixed Income Core	116,880
Opportunistic Debt	5,574,299
Real Estate	4,039,716
Private Equity	4,777,339
Real Assets	4,761,485
Hedge Funds	6,856,482
Cash	206,176
Total Management and Performance Fees	**29,213,401**
Investment Custodial Fee	56,314
Performance Management	189,650
General Consultant (Monitoring) Fee	327,212
Professional Fees	533,074
Other Fees/Expenses	167,255
Total Investment Income Expenses	**$30,486,906**

Securities Lending Expenses:	
Borrower Rebates (Refunds)	$ 711,091
Bank Fees	82,336
Total Securities Lending Expenses	**$ 793,427**

Schedule Of Consultant And Professional Expenses

For the Year Ended June 30, 2018

Professional/Consultant	Nature of Service	
Gabriel, Roeder, Smith & Co.	Actuarial	$82,052
LexisNexis Risk Data Management	Death Audit Services	816
MO Dept. of Health & Senior Services	Death Audit Services	630
MO Division of Employment Security	Death Audit Services	320
Pension Benefit Information	Death Audit Services	3,869
The Berwyn Group	Death Audit Services	1,751
Alliant Insurance Services, Inc.	Director's & Officer's Insurance	2,272
Naught-Naught	Director's & Officer's Insurance	16,117
Alliant Insurance Services, Inc.	Employee Crime Bond	1,118
Williams-Keepers, LLC	Financial Audit Services	46,700
Huber & Associates	Information Technology	45,980
Levi, Ray & Shoup, Inc.	Information Technology	203,840
Sikich, LLP	Information Technology	29,456
World Wide Technology	Information Technology	624
Thompson Coburn, LLP	Legal Consulting	29,424
Michael G. Winter Consultants, LLC	Legislative Consulting	30,000
Evercore Group LLC	Market Research	15,000
Charlesworth Benefits	Risk Management Consulting	6,000
Other	Archive Scanning	10,285
Total Operating Consultant and Professional Expenses		**$526,254**
New England Pension Consultants	General Consulting/Monitoring	$327,212
The Northern Trust Company	Performance Management	189,650
The Northern Trust Company	Investment Custodian	56,314
Total Investment Consultant and Professional Expenses		**$573,176**



Investment Section

MPERS
Serving those who keep us safe.

MoDOT & Patrol Employees' Retirement System

September 5, 2018

To the Board of Trustees and System Members:

It is my pleasure to provide you with the investment section of this year's Comprehensive Annual Financial Report (CAFR). This letter provides an overview of investment performance over the past year and our view of the investment market in the years to come.

Looking back over the past year, the most understated story has to be the "economic boom that nobody expected". The year began with a host of natural disasters that caused over $300 Billion in damages across the United States, geopolitical tensions with North Korea that included the threat of nuclear outbursts, and lingering political concerns in Europe over how to implement the Brexit vote. There was also the constant bickering between President Trump and Congress, both of whom were at risk of losing momentum on their various policy initiatives. As the U.S. economy entered its ninth year of economic expansion, very few investors envisioned what ultimately unfolded over the coming months.

Seemingly overnight, President Trump and the Republican Congress were able to set aside personality differences and push through a comprehensive tax reform package. The combination of tax reforms and a more business-friendly regulatory environment created somewhat of a "Goldilocks" environment for the financial markets, producing steady economic growth but not strong enough to produce any meaningful signs of inflation. The improved economic outlook led to yet another rally in most risk-based asset classes, while safe havens such as U.S. Treasuries lost value as interest rates rose on the improved growth outlook.

While this latest economic boost was somewhat of a surprise, we will gladly take the results as the investment portfolio had an excellent year. The overall portfolio generated a 9.42% return (net of all management fees and based on time-weighted rates of return and market valuations), which outperformed the actuarial hurdle of 7.75%, the policy benchmark of 7.72% (the return you would earn by investing passively across the targeted asset allocation), and the median public fund return of 7.61%. MPERS' one year return ranked in the top 2% of the public fund universe, while our three and five returns rank in the top 18% and 3% of the universe, respectively. Those numbers look even better on a risk-adjusted basis, as MPERS' portfolio continues to maintain a lower risk profile than 75% of our peer group (with risk measured by standard deviation of returns over the past ten year period).

For the second consecutive year, each individual asset class delivered a positive return, led by MPERS' private equity portfolio which produced a 17.2% return. The opportunistic debt portfolio (in its first full year since being carved out of the broader fixed income portfolio) generated a 12.0% return, followed by the real estate portfolio with a 10.6% return, global equities with a 9.0% return, hedge funds with a 7.8% return, and the fixed income portfolio which grinded out a 2.0% return despite the overall fixed income benchmark being negative for the year. Relative performance was also very solid, as the 1.7%

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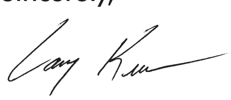
Website: www.mpers.org • **E-Mail:** mpers@mpers.org

outperformance relative to the total fund policy benchmark was the best result since fiscal year 2014.

As we look ahead to fiscal year 2019, the market remains full of skeptics. As I write this report, we face a contested Supreme Court Justice nomination, the Federal Reserve contemplating how much (not if) to raise interest rates, and increased rhetoric around whether the use of tariffs will lead to a global trade war. Given the hostility around these domestic policy issues, the upcoming mid-term elections in November will likely dominate the news headlines in October and November. While investors have proved adept at filtering out the political rhetoric, if Democrats manage to overtake the House or Senate in November it could have a lasting impact on President Trump's legislative agenda. Any one of these (or yet another unforeseen event) can send markets to a selloff. We're also in the record tenth year of the economic expansion since the financial crisis, and while I will reinforce my personal belief that expansions don't die simply from old age, you have to be mindful that a slowdown or correction is coming. On the flip side, there is a renewed sense of optimism that the recent tax reforms and regulatory relief will provide further market gains. Whether you like his style or not, President Trump's policies have been beneficial to the business climate and the U.S. economy up to this point. For now, the global economy continues to improve, and perhaps this relatively "balanced" mix of viewpoints suggest the markets have additional room to grow.

Thank you for the opportunity to serve as your Chief Investment Officer, and I hope you enjoy this year's annual report.

Sincerely,



Larry Krummen, CFA

NEPC, LLC

KEVIN M. LEONARD
PARTNER

September 2018

The Board of Trustees
MoDOT & Patrol Employees' Retirement System
PO Box 1930
Jefferson City, MO 65102

Dear Board Members:

In our role as the general investment consultant, we assist the Board in several manners: determining and executing the overall asset allocation strategy of the Plan; advising on the investment policy of the Plan; facilitating investment manager searches (both traditional and alternative asset classes); conducting custodial service searches; providing ongoing performance evaluation for each individual investment manager and the overall investment portfolio; as well as providing pertinent education to the Board.

MPERS' objective is to provide service, disability, death and vested retirement benefits to members and their beneficiaries. To ensure a solid foundation for the future of the System, MPERS has developed an investment program designed to achieve the actuarially assumed rate of return over the long term, while prudently managing the risk of the portfolio. The pension plan is required to satisfy the need to pay accumulated/earned retirement benefits today, while at the same time be prepared for "uncertain" future benefits. This balancing of short-term versus long-term needs is a key tenant in the overall construction of the portfolio. To facilitate this balance, the Board has adopted a diversified asset allocation structure. Our goal is to diversify the System's assets within the traditional and non-traditional asset classes to reduce volatility, achieve above market returns, and to better protect the portfolio against difficult market conditions.

MPERS Fiscal Year 2018 Performance and Key Initiatives

For the fiscal-year-ending June 30, 2018, the MPERS Total Plan returned 9.42% on a net-of-fees basis, outperforming the policy index return of 7.69%. For the fiscal-year-ending June 30, 2018, relative to the peer group comparison (InvestorForce Public Fund Universe), MPERS ranked in the 8th percentile (1st percentile being the highest, 100th percentile being the lowest), outpacing 92% of other public funds within the universe. For the fiscal year, total Plan performance (relative to policy index) was driven by strong absolute and relative returns within the Fund's opportunistic debt, real estate, private equity and hedge fund portfolios. On a relative basis, the fixed income portfolio performed strongly and on an absolute basis, the global equity and real asset portfolios also performed strongly.

During Fiscal Year 2018, key initiatives accomplished included:

- Conducted a comprehensive review of the Plan's asset allocation in concert with NEPC's 2018 Client Actions and Asset Class Assumptions.
    - As part of the review, NEPC and Staff evaluated the Plan's existing asset allocation and discussed any potential changes to its current structure.
        - Based on the review and discussions, NEPC and Staff recommended that no changes be made to the current investment target allocation as the existing asset allocation remains suitable.
        - A liquidity study was conducted as part of the asset allocation review.

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- The results of the liquidity study reaffirmed that the Plan's liquidity remains healthy enough to support the current allocation to alternative investments, but certain economic environments may change the liquidity profile of the Plan meaningfully.

- Continued work on the alternative investment portfolio.
  - A private market pacing plan was conducted for the opportunistic debt, private equity, real assets, and real estate portfolios. Each pacing plan provided a recommended commitment amount for upcoming vintage years and allocations to specific strategy types.
  - New strategies/managers were hired within the opportunistic debt, private equity, real assets, and real estate portfolios

As the asset allocation strategy evolves year-after-year, diversification and risk mitigation will continue to be the pillars of MPERS' asset allocation structure.

NEPC, LLC appreciates the opportunity to serve as your consultant. It is a pleasure to work with MPERS and we look forward to continuing our relationship for the benefit of the Board, Staff, and most importantly, the members of the System.

Sincerely,

Kevin M. Leonard
Partner

Investment Activity Overview

Summary of Investment Policy

The primary objective of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is to provide active and retired employees with the retirement benefits provided under Missouri law. The investment portfolio is constructed to generate a total return that, when added to employer contributions, is sufficient to meet these benefit obligations. Following prudent standards for preservation of capital, the goal is to achieve the highest possible rate of return consistent with the plan's tolerance for risk as determined by the Board of Trustees in its role as fiduciary. The Board has adopted a set of guiding principles to fulfill their fiduciary duty:

a. Preserve the long-term corpus of the fund.
b. Maximize total return within prudent risk parameters.
c. Act in the exclusive interest of the members of the system.

Risk awareness and risk management is essential to any organization. MPERS' investment policy is the starting point of our risk and investment management process. Through the investment policy, the Board defines the desired goals and outcomes of the investment program, including provisions that:

- Define the assumed rate of return for the portfolio (currently 7.75%).
- Establish an asset allocation that is expected to both meet the assumed rate of return while minimizing the impact of the fund's volatility to contribution rates.
- Define the approved asset classes and investment strategies.
- Delegate the day to day management of the investment portfolio to MPERS' staff and external asset managers.
- Establish a range of asset class allocations from which the CIO can operate.
- Establish procedures for hiring and terminating investment managers.
- Establish on-going due diligence requirements for existing managers.

Throughout the investment policy, two key investment beliefs stand out that govern the daily management of the investment portfolio:

a. Diversification is critical because the future is unknown.
b. Flexibility in investment policy implementation is critical because various asset classes will be in or out of favor at different points in the economic cycle.

To ensure the fund is operating within the risk parameters established in the investment policy, staff monitors the performance of the fund relative to MPERS' policy index. The policy index is the return that would be generated if MPERS' portfolio were invested passively across the targeted asset allocation. MPERS' investment staff strive to achieve returns that are equal to or greater than the policy index, while taking equal or less risk relative to the policy index (with risk defined by standard deviations of return). The table below shows how MPERS' portfolio compares to both the policy index and the median fund in MPERS' public fund peer universe as well as to commonly used risk measures.

Total Portfolio – Statistical Performance Portfolio Characteristics	**1-Year**	**3-Year**	**5-Year**	**10-Year**
Annualized Total Plan Return	**9.42%**	**7.12 %**	**9.04%**	**6.40 %**
Annualized Policy Benchmark Return	7.69%	6.75%	7.94%	6.20%
Annualized Peer Median Return	7.61%	6.45%	7.43%	6.23%
Total Plan Standard Deviation (1)	**2.85**	**3.47**	**3.57**	**7.79**
Policy Benchmark Standard Deviation	3.03	3.83	3.76	7.38
Peer Median Standard Deviation	4.60	6.01	5.91	9.30
Total Plan Sharpe Ratio (2)	**2.84**	**1.87**	**2.42**	**0.78**
Policy Benchmark Sharpe Ratio	2.11	1.60	2.01	0.80
Peer Median Sharpe Ratio	1.32	0.97	1.21	0.65
Correlation to Policy Benchmark (3)	**0.91**	**0.85**	**0.80**	**0.93**

**As compared to the total fund policy benchmark*

1. *Standard Deviation* measures historical volatility and specifically measures the dispersion of a set of data points (i.e.: monthly returns) from their mean. If the data points are further from the mean, the standard deviation is higher.
2. *Sharpe Ratio* measures historical volatility and specially measures the dispersion of a set of data points (ie: monthly returns) from their mean. If the data points are further from the mean, the standard deviation is higher.
3. *Correlation* measures how the Fund's portfolio and the policy benchmark moves are related and if both are reacted to market forces in the same manner. The System's portfolio have a correlation of less than 1 indicating that while it will typically move in the same direction as the policy benchmark, it will not move in lockstep with the total policy benchmark.

Investment Activity Overview

When evaluating these results, it is important to note that MPERS' policy index is comprised of a mix of asset classes, including several alternative asset classes with benchmarks that are not investable (notably private equity with its S&P 500 + 3% illiquidity benchmark, real assets with its CPI + 4% real return benchmark, as well as the real estate and hedge fund benchmarks). MPERS also evaluates investment performance on a net of fees basis, while acknowledging that most asset class benchmarks report performance on a gross of fees basis. Management fees represent a significant hurdle for staff to overcome when comparing results to MPERS' policy index, which is demonstrated by how well MPERS' policy index has performed relative to the broader public fund peer universe. MPERS' strong risk adjusted performance gives the Board confidence they have adopted a prudent investment strategy that is fulfilling their role as fiduciary to the System.

Fair Value of Investments

As of June 30, 2018, MPERS' investment portfolio had a total fair value of $2.312 billion, representing an increase of $149 million from fiscal year-end 2017. Over the course of the year, an additional $47 million was transferred out of the fund to meet benefit payments and other obligations. When viewed together, the net increase to the portfolio from investment activity equated to $196 million.

Investment Performance

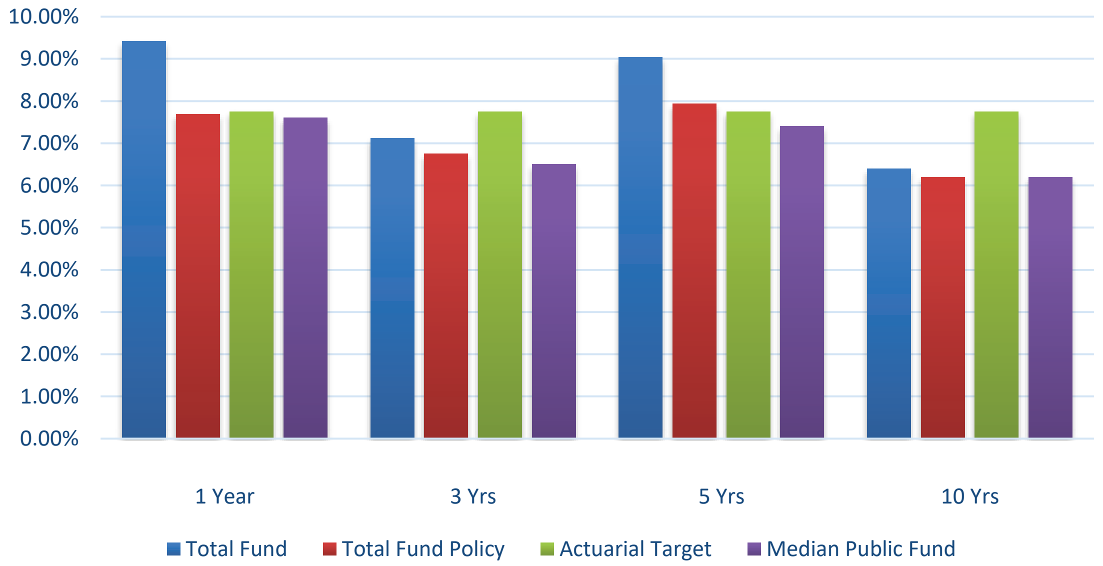
Fiscal year 2018 was a positive year for MPERS' investment portfolio from both a total return and a relative return perspective. The fund generated a 9.42% return for the year, net of all management fees and based on time-weighted rates of return and market valuations. The individual asset classes all delivered positive returns for the year, led by the private equity portfolio with a 17.15% return and the opportunistic debt and real estate portfolios which both delivered double digit returns of 11.96% and 10.57%, respectively. The global equity, hedge fund, real assets and fixed income portfolios generated returns of 9.90%, 7.78%, 6.12% and 2.01%, respectively. Fiscal year 2018 is the first full year that opportunistic debt was broken out as its own asset class, as it was previously included under the broader fixed income portfolio. The performance across the major asset classes (and their respective benchmarks) is listed below.

Investment Performance (including Benchmarks)	**1-Year**	**3-Year**	**5-Year**	**10-Year**
Total Fund	**9.42%**	**7.12%**	**9.04%**	**6.40%**
Policy Benchmark	*7.69*	*7.75*	*7.94*	*6.20*
Peer Universe Ranking (%)	*8*	*18*	*3*	*40*
Global Equity	9.90	8.33	9.98	6.62
MSCI ACWI	*10.73*	*8.19*	*9.41*	*5.80*
Private Equity	17.15	10.51	14.11	8.37
S&P 500 + 3%	*17.37*	*14.07*	*16.67*	*12.15*
Fixed Income	2.01	4.40	5.55	5.90
Barclays US Agg Gov/Credit	*-0.63*	*2.01*	*2.56*	*4.10*
Opportunistic Debt	11.96	n/a	n/a	n/a
Barclays US Corp HY	*2.62*	*n/a*	*n/a*	*n/a*
Real Estate	10.57	9.29	11.56	5.22
NFI-ODCE	*7.68*	*8.70*	*10.21*	*6.42*
Real Assets	6.12	3.25	5.96	n/a
CPI + 4%	*6.98*	*5.90*	*5.59*	*n/a*
Hedge Funds	7.78	2.82	4.54	3.93
HFRI Fund of Funds	*5.11*	*1.91*	*3.44*	*1.39*

When evaluating performance, the Board of Trustees looks at three primary performance objectives: a) to meet or exceed the actuarial assumed rate of return of 7.75% over long periods of time, b) to outperform a policy benchmark that represents the return that could be achieved by investing passively in the broad markets in the same percentages to MPERS' target asset allocation, and c) to rank at or above the public fund peer group's median investment return.

Investment Activity Overview

Historical returns versus the three primary performance goals are listed graphically below:



MPERS' one year and five year returns were safely above the actuarial target, while MPERS' three year performance remains muted relative to the actuarial target hindered by the flat performance in fiscal year 2016. The ten year results remain below the 7.75% target as it reflects the poor market performance during the financial crisis of 2008 and 2009. The fund continues to perform well relative to policy benchmarks over all time periods. Performance relative to the public fund peer universe remains very strong, with the one, three and five year returns ranking in the top 8th, 18th and 3rd percentile, respectively.

Asset Allocation Overview

There were no revisions to MPERS' asset allocation targets in fiscal year 2018. As of June 30, 2018, all of the sub-asset class allocations were within the acceptable ranges established by MPERS' investment policy. Any deviance relative to the target allocation represents a conscious decision based on the investment staff's view of the market. The chart below lists the target and actual asset allocation as of June 30, 2018, followed by commentary on each of the underlying asset classes.

Asset Class	FY2018 Target Allocation	Ending FY2018 Allocation
Global Equity	30.0%	29.46%
Private Equity	15.0%	15.99%
Fixed Income	20.0%	16.26%
Opportunistic Debt	7.5%	10.25%
Real Assets	7.5%	11.08%
Real Estate	10.0%	9.73%
Hedge Funds	10.0%	6.36%
Cash	0.0%	0.87%

Investment Activity Overview

Global Equity:

MPERS began the year with a 30.70% allocation to global equities, representing a slight overweight versus the targeted allocation of 30%. The combination of record low volatility and an improving economic outlook continued to push equity markets higher throughout the remainder of calendar year 2018, which drove our allocation above 31% at the end of the calendar year. After nearly a decade of relatively calm equity markets, volatility returned to the equity markets in the first quarter of 2018 driven by rising interest rates, the fear of inflation, and rising geopolitical tensions. Given the increased market volatility and relatively high valuations, we moved back to a neutral position in towards the end of fiscal year 2018.

Overall, it was another excellent year for the global equity markets in terms of performance, despite the stretched valuations and continued threats of geopolitical issues. MPERS' global equity portfolio generated a 9.9% return for the fiscal year, but there was widespread dispersion across the various underlying markets and strategies. MPERS' domestic equity portfolio led the way with a 12.6% return, while international markets lagged U.S. markets due to a stronger U.S. Dollar and weakness in the emerging markets. We continue to overweight master limited partnerships (MLPs) within the equity portfolio, based on their strong dividend yields of roughly 6.5% and relatively low exposure to underlying commodities. Unfortunately MLPs continue to underperform the broader equity indexes as investors are concerned over the MLP structural changes and new FERC rulings. MLPs were down nearly 2% for the fiscal year, but performance has stabilized and the strategy was up over 11% in the second quarter of 2018. We continue to favor the strategy over the long term.

Fixed Income:

MPERS' remained consistently underweight compared to the targeted fixed income allocation of 20% throughout the entire year, starting the year just above the minimum permissible range with a 15.2% allocation and ending the year with a 16.3% allocation. Managing the allocation to fixed income in the current interest rate environment continues to be a balancing act. While fixed income strategies (particularly long duration Treasuries) offer the best diversification against equity market risk and other various strategies dependent on economic growth, we are also mindful of the difficulty of meeting MPERS' long term actuarial return target of 7.75%. At the start of the fiscal year, the 30 year Treasury had a yield of 2.84%. For every dollar you invest that earns 2.84%, you need to find another investment that earns 12.66% to generate an average return of 7.75%. With the economy entering a record tenth year of expansion and equities at/near all-time highs, finding 12+% returns is an extremely difficult task. That leaves pension funds with a recurring dilemma; while U.S. Treasuries provide excellent diversification, investing any considerable amount of funds in them virtually guarantees you will not meet your actuarial return hurdle. MPERS tries to balance this risk by mixing a blend of fixed income strategies, including core fixed income strategies that offer a modest coupon with limited exposure to rising interest rate risk, inflation protected securities that will perform better in rising inflation periods, and long duration securities that offer diversification in times of falling economic growth.

From a performance perspective, it was another challenging year for fixed income investors. The lack of volatility in the equity markets continued to push investors towards stocks versus bonds (sending bond prices lower and yields higher). The Federal Reserve also raised the overnight Federal Funds Rate three times during the fiscal year, creating a flatter yield curve making longer-term bonds less attractive (investors typically favor shorter term bonds if there is not an incremental pickup in yield by extending maturities). Overall, MPERS' fixed income portfolio did very well relative to the benchmark, earning a 2.0% return versus the benchmark which lost 0.6% of value throughout the year. The absolute return nature (and short duration) of MPERS' internally managed portfolios, along with strong performance from our active fixed income managers were the primary drivers of the relative performance during the year.

Given the Federal Reserve is still on a path to raise short term rates and the U.S. economy continues to grow, we continue to favor growth investments in the portfolio versus traditional fixed income securities. We are watching interest rates closely, however, and intend to gradually reduce the underweight position to traditional fixed income securities if rates continue their grind higher. The Federal Reserve is expected to raise rates another two times in calendar year 2018, which could potentially lead to a flat (and possibly inverted) yield curve all the way from 2-year Treasuries out to 30-year Treasuries. While not 100% accurate, this is typically a leading indicator of a future recession. Should the yield curve approach zero and economic conditions deteriorate for any reason, we will likely move to a more defensive posture in the overall portfolio and increase MPERS' fixed income exposure.

Opportunistic Debt:

Fiscal Year 2018 marks first full year of separate performance for the opportunistic debt portfolio, as it was previously a sub-sector of the broader fixed income portfolio. The benchmark for the portfolio is the Barclays US Corporate High Yield Index. The decision to carve out the portfolio was driven by the constant flow of opportunities that has evolved in the sector over the recent years, which warranted a separate mandate and a benchmark that more accurately reflected the sector's risk profile. The portfolio is comprised of a mix of direct lending

portfolios that throw off capital quickly and some more esoteric strategies to boost returns.

MPERS started the fiscal year with a 9.2% allocation to opportunistic debt, relative to a 7.5% policy target. It was another strong year of performance in the sector, as the 11.96% return for the year outperformed the benchmark return of 2.62%. The strong performance, along with our additional commitments, drove our ending allocation up to 10.25%. While the portfolio is broadly built out, we continue to find interesting investments in more sector-focused funds that are complementary to the current portfolio. We will likely maintain an overweight to the asset class for the foreseeable future.

Hedge Funds:

MPERS' remained consistently underweight the targeted hedge fund allocation of 10% throughout the entire year, starting the year with a 6.9% allocation and ending the year with a 6.4% allocation. On a relative basis, performance across the hedge fund portfolio was strong in fiscal year 2018, as the portfolio generated a return of 7.78% versus the benchmark return of 5.50%. Equity-oriented strategies (such as long/short equity and activist equity) fared very well during the year, consistent with the overall upward trend in equities. Performance was also strong with our global macro managers and event-driven strategies (such as merger arbitrage). While we are happy with the relative performance, the changing regulatory and political environment continues to be quite a challenge for the hedge fund industry, as market movements have been dominated by macro events (outside of a manager's control) instead of bottom up fundamentals. The trend towards passive management in the equity markets has also been a challenge for many equity-oriented strategies. Ultimately, we believe this represents an opportunity for the industry over the long term but remains a short-term hurdle for many managers. Together with the fees associated with hedge funds, we expect to remain underweight the 10% allocation target over the coming year.

Real Assets:

We continued to build out and grow the real assets' portfolio throughout fiscal year 2018, ending the year with an 11.1% allocation versus the policy target of 7.5%. The portfolio now has a balanced mix of timber & natural resources (35% of total), energy (34%), power & infrastructure (18%), and metals & mining strategies (13%). The recent focus on timber & natural resources was an effort to diversify the portfolio and provide a core strategy to offset the volatility embedded in the energy sector. Overall the real assets' portfolio generated a return of 6.12% in fiscal year 2018, versus a policy benchmark of 6.89%. MPERS' energy-related strategies performed very well, as oil prices trended up towards $70/barrel throughout the year. The timber & natural resources portfolio also contributed positively to absolute performance during the year, albeit underperforming the overall asset by generating a 2.5% return. We are pleased with the overall construction of the timber portfolio, but expect returns to be somewhat lumpy over the coming years and dependent on our ability to execute the operating strategy and subsequently liquidate the portfolio.

Real Estate:

MPERS' real estate portfolio has a target allocation of 10% of assets and includes a mix of public and private equity strategies, along with tactical exposures to public and private debt strategies. MPERS started the year with a 10.4% allocation and marginally reduced the allocation over the course of the year, ending with a 9.7% allocation. The portfolio generated a 10.57% return for the year, outperforming the policy benchmark return of 7.68%. The core real estate portfolio (primarily stabilized and fully leased properties) generated an 8.3% return, while the non-core portfolio (value added or opportunistic real estate strategies) returned an impressive 15.7% return. The publicly traded REIT (real estate investment trust) portfolio also contributed positive performance, returning 5.8% for the year.

We continue to monitor the rising interest rate environment and are mindful of the strong correlation between core real estate and interest rates. We believe that capitalization (cap) rates on core real estate have hit their lows for the current cycle, and further increases in interest rates will likely coincide with increased cap rates for real estate (sending core real estate pricing lower). Net operating income growth within the underlying properties can offset the increased cap rates, as many properties are roller over rental agreements put in place shortly after the financial crisis (when rental rates were much lower), but investors are definitely lowering their return expectations going forward. Given that backdrop, we will likely maintain a neutral or slight underweight to the asset class over the intermediate term.

Private Equity:

MPERS maintained a modest overweight to the targeted allocation of 15% to private equity throughout fiscal year 2018, starting the year at 16.13% and ending the year at a 15.99% allocation. Private equity was our best performing asset class for the year, generating a 17.15% return. While still underperforming the benchmark (S&P 500 + 3%), which generated a 17.37% return, the portfolio is maturing nicely as fiscal year 2018 was the fourth consecutive year where distributions (from portfolio company sales) outpaced new capital calls. The "public equity plus" benchmark has been difficult to outperform in recent years given the strength of public equity markets and the relative immaturity of MPERS' private equity portfolio. It is important to note that relative performance is only a portion

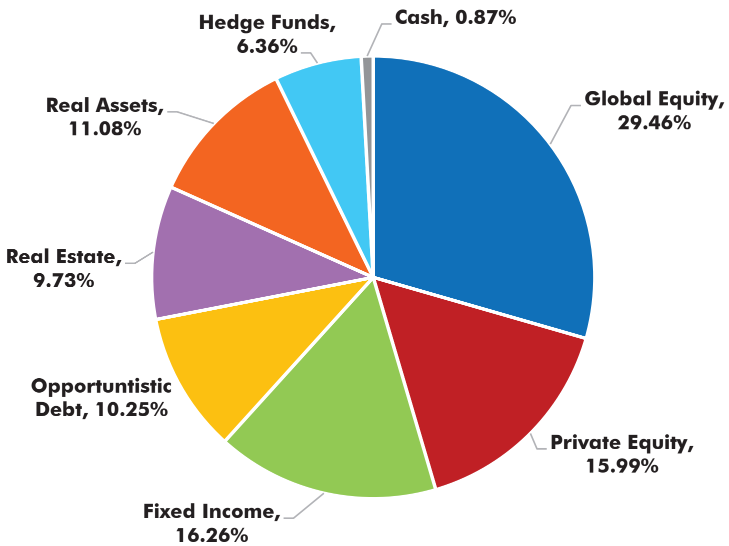
Investment Activity Overview

of the overall strategy. From a total return perspective, private equity remains our best performing strategy over the trailing one, three, five, and ten year periods. It has simply struggled to keep up with a very challenging benchmark, which is not an investable index (you cannot passively invest into an S&P 500 + 3% benchmark). We are optimistic that relative performance will improve as the portfolio continues to mature and more underlying companies advance toward their ultimate exit strategy, and when/if the returns in the public equity markets start to moderate.

Looking Forward

As we look to fiscal year 2019, there are plenty of reasons to be skeptical on investment returns going forward. Whether it is the risk of rising interest rates, the constant noise and "bickering" coming from policy makers in Washington, D.C., or some unforeseen geo-political event, there will certainly be bouts of short term volatility in the marketplace. As long term investors, we have to resist the urge to let short-term market "noise" alter our perspective but rather use that as an opportunity to capitalize on other's fear and uncertainty. We have been successful in building out a balanced investment portfolio, and as long as we can keep that long term perspective, it will serve our members well in the future.

Investment Summary



Amounts Reported by Management-Type Allocation 6/30/2018

	Fair Value	% of Fair Value
Global Equity	$ 681,358,969	29.46%
Private Equity	369,745,317	15.99%
Fixed Income	376,102,137	16.26%
Opportuntistic Debt	236,999,916	10.25%
Real Estate	225,142,615	9.73%
Real Assets	256,324,056	11.08%
Hedge Fund	147,195,980	6.36%
Cash	20,104,250	0.87%
Total Investments	$2,312,973,240	100.00%

Reconciliation to Statement of Plan Net Assets:

Less Accrued Investment Interest and Income	$ (6,383,098)
Less Investment Sales Receivable	(6,843,573)
Plus Investment Purchases Payable	7,057,400
Currency Adjustment	138,681
	$2,306,942,650

Largest Investment Holdings

Largest Equity Securities

(Non-Commingled Funds)

Security	Fair Value	% of Total
ENTERPRISE PRODS PARTNERS LP	$6,628,570	0.287%
MAGELLAN MIDSTREAM PARTNERS LP	6,256,576	0.270%
WILLIAMS PARTNERS LP	5,698,065	0.246%
MPLX LP	5,307,951	0.229%
PLAINS ALL AMERICAN PIPELINE LP	4,505,122	0.195%
ONEOK INC	4,145,598	0.179%
WESTN GAS PARTNERS LP	4,019,177	0.174%
ENERGY TRANSFER EQUITY LP	3,769,746	0.163%
PHILLIPS 66 PARTNERS LP	3,315,224	0.143%
EQT MIDSTREAM PARTNERS LP	3,213,438	0.139%

Largest Fixed Income Securities

(Non-Commingled Funds)

Par Value	Security	Fair Value
14,000,000	USA TREASURY NTS 1.125% TIPS 15/1/21 USD1000 01-15-2021	$16,244,783
15,200,000	CONNECTICUT STUDENT LN FNDTN STUDENT LN ARCS-SR SER A-1 01 JUN 2046	15,133,880
15,000,000	FEDERAL FARM CR BKS 3.1% 01-04-2035	14,222,700
13,152,180	MISSOURI HIGHER ED LN AUTH STUD LN REV VAR-SER A-1 VAR RT DUE 11-26-2032 REG	13,263,710
15,000,000	UNITED STATES TREAS BDS 2.25% DUE 08-15-2046	12,918,750
11,400,000	UNITED STATES OF AMER TREAS BONDS 2.75 BDS DUE 08-15-2042 USD100'BONDS 08/42'	10,970,277
10,000,000	UNITED STATES OF AMER TREAS BONDS 0.75 DEB TIPS 02-15-2042	10,826,907
10,513,000	PVTPL ED LN AST-BACKED TR I 2013-1 SR NTCL A2 144A VAR RT DUE 04-26-2032 BEO	10,562,464
10,503,000	FEDERAL FARM CR BKS CONS SYSTEMWIDE 3.56% 01-11-2038	10,130,144
10,000,000	CONNECTICUT STUDENT LN FNDTN STUDENT LN ARCS-SR SER A-2 01 JUN 2046	9,956,500
9,178,000	TVA 6.235 BD DUE 07-15-2045 ONE-TIME OPTPUT PAY 7-15-2001 @ PAR LAST NOTF 1**PUT	9,812,567
10,000,000	FFCB DTD 2.93 04-27-2029	9,633,500
10,000,000	PVTPL U S ED LN TR III LLC SER 2004 STUDLN BKD SR NT 144A A-3 VAR 6-1-39	9,617,721
10,000,000	ACCESS GROUP INC DEL 2004-1 STUD LN AST BKD NT CL A-4 12-27-2032/09-27-2007 REG	9,597,222
10,000,000	UNITED STATES OF AMER TREAS BONDS DTD 05/15/2016 2.5% DUE 05-15-2046 REG	9,086,720
9,150,000	BRAZOS HIGHER ED AUTH INC STUD LN BKD NT2007-1 CL I-A-4 VAR RT DUE 06-25-2043	8,968,373
9,600,000	EDUCATION LN ASSET BACKED TR I FLTG RT 4.25% 08-01-2043 REG	8,304,000
6,000,000	UNITED STATES TREAS BDS INDEX LINKED 1.75 DUE 01-15-2028 REG	7,841,663
6,995,000	FFCB 3.89% DUE 06-01-2043	7,414,490
6,841,103	SC STUD LN CORP REV VAR-STUD LN BKD NTS-A-4 VAR RT 09-03-2024 REG TAXABLE	6,901,578

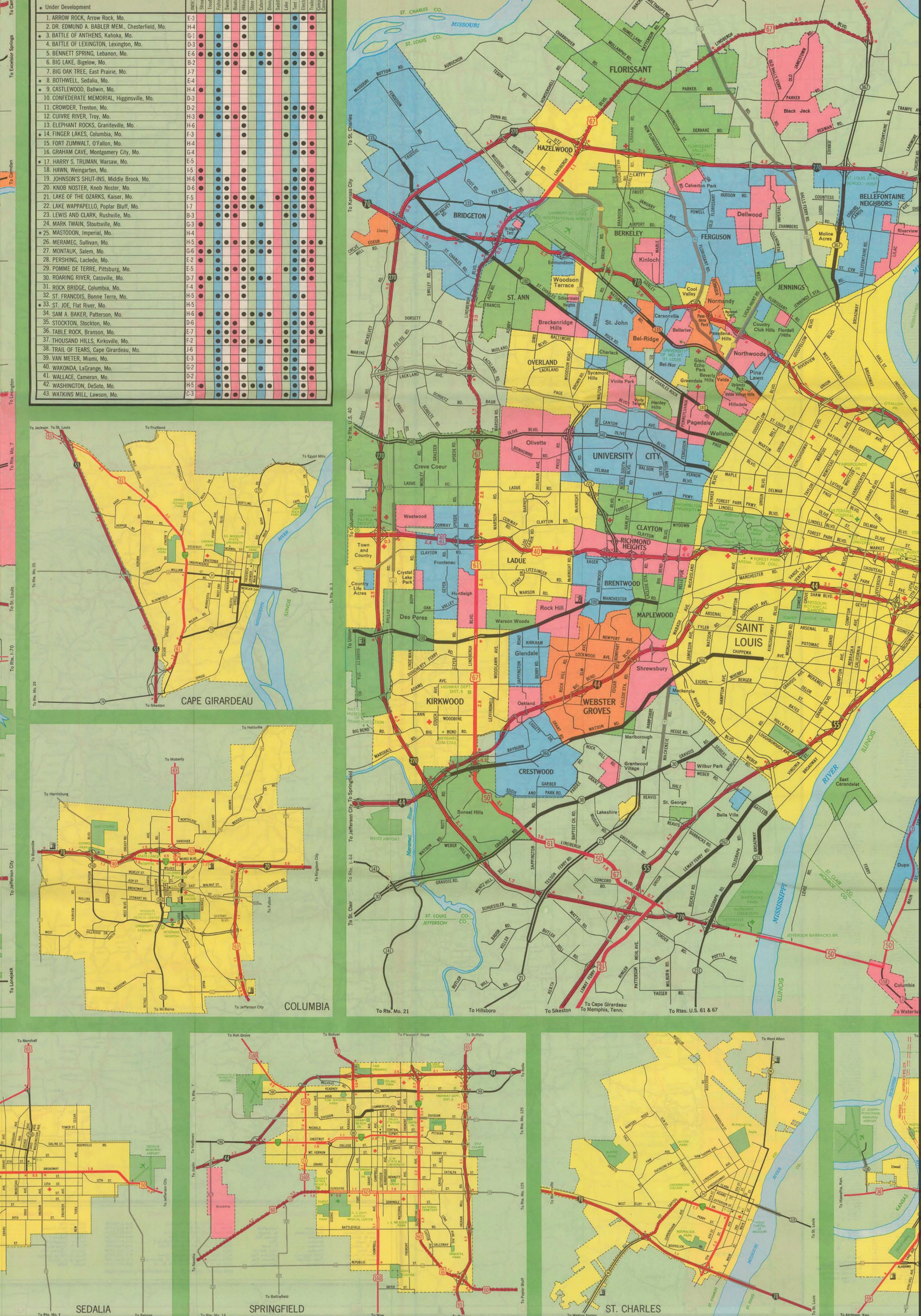
Space and cost restrictions make it impractical to print the entire investment portfolio in this report. However, a portfolio listing is available for review in the office of the executive director of MPERS.

Schedule of Investment Expenses

	Fair Value of Assets Under Management at 6/30/2018	Fees Accrued During FY2018
Management and Performance Fees:		
Equities	$681,358,969	$2,881,024
Fixed Income Core	376,102,137	116,880
Opportunistic Debt	236,999,916	5,574,299
Real Estate	225,142,615	4,039,716
Private Equity	369,745,317	4,777,339
Real Assets	256,324,056	4,761,485
Hedge Funds	147,195,980	6,856,482
Cash	20,104,250	206,176
Total Management and Performance Fees	**$2,312,973,240**	**$29,213,401**
Investment Custodial Fee		56,314
Performance Management		189,650
General Consultant (monitoring) Fee		327,212
Professional Fees		533,074
Other Investment Expenses		167,255
Total Investment Income Expenses		**$30,486,906**
Securities Lending Expenses:		
Borrower Rebates (Refunds)		$ 711,091
Bank Fees		82,336
Total Securities Lending Expenses (Income)		**$ 793,427**

Schedule of Brokerage Commissions

Brokerage Firm	Total Commission	Number of Shares	Commission Rate
VIRTU AMERICAS LLC	$28,809	2,162,529	$0.0133
BTIG LLC	17,837	580,158	0.0307
WEEDEN AND CO	15,964	1,572,532	0.0102
KEEFE BRUYETTE	15,049	1,007,058	0.0149
MERRILL LYNCH	10,260	31,085,092	0.0003
FIG PARTNERS LLC	8,537	223,432	0.0382
JEFFERIES LLC	8,057	320,396	0.0251
COWEN AND COMPANY LLC	7,322	198,753	0.0368
BARCLAYS CAPITAL INC	7,260	268,029	0.0271
B. RILEY AND CO., LLC	5,799	142,522	0.0407
RAYMOND JAMES & ASSOCIATES, INC.	5,227	177,854	0.0294
INVEMED ASSOCIATES LLC	4,454	97,100	0.0459
J.P. MORGAN SECURITIES LLC	4,191	6,408,978	0.0007
UBS	3,658	343,705	0.0106
MKM PARTNERS	3,359	100,837	0.0333
CITIGROUP GLOBAL MARKETS INC.	2,930	11,088,210	0.0003
INTERACTIVE BROKERS LLC	2,801	61,973	0.0452
WELLS FARGO BANK, N.A.	2,673	13,135,764	0.0002
D. A. DAVIDSON & CO.	2,581	78,393	0.0329
CITATION GROUP (THE)	2,055	43,100	0.0477
MORGAN STANLEY & CO. LLC	1,983	26,783,762	0.0001
STIFEL NICOLAUS & CO,INCORORATED	1,955	66,398,891	0.0000
RBC CAPITAL MARKETS, LLC	1,835	47,299,312	0.0000
WEDBUSH SECURITIES INC.	1,784	53,200	0.0335
SANDLER O'NEILL & PARTNERS L.P.	1,690	74,282	0.0228
CREDIT SUISSE EQUITIES (AUSTRALIA)	1,535	3,114,625	0.0005
CRAIG - HALLUM	1,489	42,430	0.0351
GOLDMAN, SACHS & CO.	1,469	2,056,935	0.0007
EXANE S.A.	1,400	131,014	0.0107
KEMPEN AND CO N.V.	1,297	24,122	0.0538
STEPHENS INC.	1,168	68,477	0.0171
IMPERIAL CAPITAL LLC	1,104	78,243	0.0141
WM SMITH & CO	1,058	34,190	0.0309
MIZUHO SECURITIES USA INC.	1,031	39,703	0.0260
OTHER (57 firms less than $1,000 each)	14,487	556,272,204	0.0000
Total	**$194,110**	**771,567,805**	
Average Commission Rates			**$0.0003**


* Under Development
1. ARROW ROCK, Arrow Rock, Mo. E-3
2. DR. EDMUND A. BABLER MEM., Chesterfield, Mo. H-4
* 3. BATTLE OF ANTHENS, Kahoka, Mo. G-1
4. BATTLE OF LEXINGTON, Lexington, Mo. D-3
5. BENNETT SPRING, Lebanon, Mo. E-6
6. BIG LAKE, Bigelow, Mo. B-2
7. BIG OAK TREE, East Prairie, Mo. J-7
* 8. BOTHWELL, Sedalia, Mo. E-4
* 9. CASTLEWOOD, Ballwin, Mo. H-4
10. CONFEDERATE MEMORIAL, Higginsville, Mo. D-3
11. CROWDER, Trenton, Mo. D-2
12. CUIVRE RIVER, Troy, Mo. H-3
13. ELEPHANT ROCKS, Graniteville, Mo. H-6
* 14. FINGER LAKES, Columbia, Mo. F-3
15. FORT ZUMWALT, O'Fallon, Mo. H-4
16. GRAHAM CAVE, Montgomery City, Mo. G-4
* 17. HARRY S. TRUMAN, Warsaw, Mo. E-5
18. HAWN, Weingarten, Mo. I-5
19. JOHNSON'S SHUT-INS, Middle Brook, Mo. H-6
20. KNOB NOSTER, Knob Noster, Mo. D-6
21. LAKE OF THE OZARKS, Kaiser, Mo. F-5
22. LAKE WAPPAPELLO, Poplar Bluff, Mo. I-7
23. LEWIS AND CLARK, Rushville, Mo. B-3
24. MARK TWAIN, Stoutsville, Mo. G-3
* 25. MASTODON, Imperial, Mo. H-4
26. MERAMEC, Sullivan, Mo. H-5
27. MONTAUK, Salem, Mo. G-6
28. PERSHING, Laclede, Mo. E-2
29. POMME DE TERRE, Pittsburg, Mo. E-5
30. ROARING RIVER, Cassville, Mo. D-7
31. ROCK BRIDGE, Columbia, Mo. F-4
32. ST. FRANCOIS, Bonne Terre, Mo. H-5
* 33. ST. JOE, Flat River, Mo. H-5
34. SAM A. BAKER, Patterson, Mo. H-6
35. STOCKTON, Stockton, Mo. D-6
36. TABLE ROCK, Branson, Mo. E-7
37. THOUSAND HILLS, Kirksville, Mo. F-2
38. TRAIL OF TEARS, Cape Girardeau, Mo. J-6
39. VAN METER, Miami, Mo. E-3
40. WAKONDA, LaGrange, Mo. G-2
41. WALLACE, Cameron, Mo. D-2
42. WASHINGTON, DeSoto, Mo. H-5
43. WATKINS MILL, Lawson, Mo. C-3
CAPE GIRARDEAU
COLUMBIA
SAINT LOUIS
ST. LOUIS
SEDALIA
SPRINGFIELD
ST. CHARLES
ST. JOSEPH

Actuary's Certification Letter

GRS Retirement Consulting

800.521.0498 | P: 248.799.9000 | F: 248.799.9020 | www.grsconsulting.com

September 19, 2018

Retirement Board
Missouri Department of Transportation
and Highway Patrol Employees' Retirement System
1913 William Street
Jefferson City, Missouri 65102-1930

Ladies and Gentlemen:

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report. This report should not be relied on for any purpose other than the purpose described.

The basic financial objective of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is to establish and receive contributions which:

1. when expressed in terms of percents of active member payroll, will remain approximately level from generation to generation of Missouri citizens; and

2. when combined with present assets and future investment returns, will be sufficient to meet the present and future financial obligations of MPERS.

In order to measure progress toward this fundamental objective, MPERS has annual actuarial valuations performed. The valuations (i) measure the present financial position, and (ii) establish contribution rates that provide for the current cost and level percent-of-payroll amortization of unfunded actuarial liabilities over a reasonable period. An actuarial valuation was performed based upon benefit conditions, data and assumptions as of June 30, 2018. This valuation indicates that contribution rates for the period beginning July 1, 2019 that are at least equal to the calculated contribution rates will meet the Board's financial objective. The calculated contribution rates are 58.00% of payroll for the 6,160 Non-Uniformed employees and 58.00% of payroll for the 1,231 Uniformed patrol employees.

The plan administrative staff provides the actuary with data for the actuarial valuation. The actuary relies on the data after reviewing it for internal and year to year consistency. Member data was not audited by the actuary. The actuary summarizes and tabulates population data in order to analyze longer term trends. We are not responsible for the accuracy or completeness of the data provided by MPERS.

Retirement Board
September 19, 2018
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Gabriel, Roeder, Smith & Company was responsible for the following schedules found in the Actuarial Section:

Summary of Actuarial Assumptions and Methods
- Probabilities of Separation from Active Employment
- Individual Salary Increases
- Joint Life Retirement Values
- Probabilities of Retirement for Members
- Probabilities of Disability for Members

Summary of Member Data Included in Valuations
- Active Members by Attained Age and Years of Service
- Schedule of Active Member Valuation Data

Solvency Test
Derivation of Financial Experience
Schedule of Retirees and Beneficiaries Added and Removed
Summary of Plan Provisions
Legislative Changes

Gabriel, Roeder, Smith & Company was responsible for the following schedules found in the Financial Section:

- Schedule of Changes in the Employer's Net Pension Liability
- Schedule of Employer's Net Pension Liability
- Schedule of Employer Contributions
- Schedule of the Actuarially Determined Contributions

Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. These assumptions are adopted by the Board. The assumptions and the methods comply with the requirements of the Governmental Accounting Standards Board. Each actuarial valuation takes into account all prior differences between actual and assumed experience in each risk area and adjusts the contribution rates as needed. Actuarial methods and assumptions were adopted by the Board pursuant to the June 30, 2017 Experience Study. Gabriel, Roeder, Smith & Company has produced the following reports as of June 30, 2018:

- Annual Actuarial Valuation Report
- GASB Nos. 67 and 68 Valuation Report

In order to gain a full understanding of the condition of this plan, these reports should be read in their entirety.

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To the best of our knowledge, the report is complete and accurate and was made in accordance with standards of practice promulgated by the Actuarial Standards Board. The assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice. The actuarial assumptions used for the valuation produce results which, individually and in the aggregate, are reasonable.

The employer contributions determined in this report are based on Board funding policy. This policy is discussed on page 4 of the annual actuarial valuation report. We commend the Board for its aggressive monitoring and updating of the funding policy over the recent past. However, continued employer contributions at the current level do not guarantee benefit security. We therefore encourage the Board to continue to routinely monitor and update its funding policy and to continue to consider benefit security when doing so.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

This report has been prepared by individuals who have substantial experience valuing public employee retirement systems. Heidi G. Barry is a Member of the American Academy of Actuaries (MAAA) and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing individuals are independent of the plan sponsor.

Based upon the valuation results, it is our opinion that the Missouri Department of Transportation and Highway Patrol Employees' Retirement System continues to operate in accordance with actuarial principles of level percent-of-payroll financing. It is important to the well-being of the System that it continues to receive contributions at the actuarially determined levels. It is also important to continue to monitor both the total funded status and the funded status of the retiree liabilities to ensure that the funding policy is consistent with the expected life span of the respective unfunded obligation.

Respectfully

Heidi G Barry

Heidi G. Barry, ASA, MAAA

Kenneth G. Alberts

Kenneth G. Alberts

Summary of Actuarial Methods and Assumptions

Valuation Date: .... June 30, 2018
Actuarial Cost Method: .... Entry Age
Amortized Method: .... Closed, level percent of payroll
Remaining Amortization Period: .... 14 years (single equivalent period)
Asset Valuation Method: .... 3-year smoothing
Actuarial Assumptions:
- Investment Rate of Return: 7.00%
- Projected Salary Increase: .... 3.00% to 12.45%
- Cost-of-Living Adjustments: .... 1.80% Compound
- Includes Wage Inflation at: 3.00%

An actuarial valuation is based upon an actuarial cost method, an asset valuation method, and actuarial assumptions. These methods and assumptions are chosen by the Board of Trustees after consultation with the Actuary and other advisors.

The actuarial cost method is called the Entry Age Actuarial Cost Method. This method is consistent with the Board's level percent-of-payroll funding objective. With this method, the level percent-of-payroll is determined that will fund a member's retirement benefit over the member's entire working lifetime, from date of hire (Entry Age) to date of exit from the active member population. Differences in the past between assumed and actual experience become part of unfunded actuarial accrued liabilities and are amortized with level percent-of-payroll contributions. This cost method was first used in the June 30, 1999 valuation.

The asset valuation method is a three-year smoothed market value method in which assumed investment return is recognized immediately each year and differences between actual and assumed investment return are phased-in over a closed three-year period. This asset valuation method is intended to give recognition to the long term accuracy of market values while filtering out and dampening short term market swings. This method was first used in the June 30, 1999 valuation.

The actuarial assumptions used in producing the valuation fall into two broad classes: economic assumptions, and demographic assumptions. Economic assumptions refer to long term rates of investment return, wage growth, covered population growth, and inflation. Demographic assumptions refer to retirement rates, turnover rates, disability rates, merit and seniority pay increases, and mortality rates. The current assumptions are based upon a 2012-2017 study of experience of the MPERS. The assumptions are reviewed from time to time to keep them reasonably current with expected experience. The next experience study is scheduled to follow the June 30, 2022 valuation.

Economic Assumptions

The investment return rate used in making the valuation was 7.00% per year, compounded annually (net after administrative expenses). This rate of return is not the assumed real rate of return. The real rate of return over wage inflation is defined to be the portion of investment return which is more than the wage inflation rate. Considering wage inflation recognition of 3.00%, the 7.00% rate translates to an assumed real rate of return over wage inflation of 4.00%. This rate was first used for the June 30, 2018 valuation.

Pay increase assumptions for individual active members are shown on Table I. Part of the assumption for each year of service is for a merit and/or seniority increase, and the other 3.00% recognizes wage inflation. These rates were first used for the June 30, 2018 valuation.

Summary of Actuarial Assumptions and Methods

Price Inflation is assumed to be 2.25%. This results in a 1.8% annual COLA assumption. It is assumed that the 1.8% COLA will always be paid**.**

The Active Member Group size is assumed to remain constant at its present level.

The active member payroll for all members is assumed to increase 3.00% annually.

Non-Economic Assumptions

The mortality table used to measure Post-Retirement Healthy Mortality Rates are from the RP-2014 Healthy Annuitant Mortality Tables projected to 2022 using projection scale MP-2017. Post-Retirement Disabled Mortality Rates use the RP-2014 Disabled Retiree Annuitant Mortality Tables projected to 2022 using projection scale MP-2017. Pre-Retirement Mortality Rates use the RP-2014 Employee Mortality Tables projected to 2022 using projection scale MP-2017 and multiplied by a factor of 65%. These tables were first used for the June 30, 2018 valuation.

The probabilities of retirement for members eligible to retire are shown on Rates of Retirement table. The rates for full retirement were first used in the June 30, 2018 valuation. The rates for reduced retirement were first used in the June 30, 2018 valuation. Upon retirement, members are assumed to pick the BackDROP period that when combined with the remaining annuity produces the highest liability.

The probabilities of disability for members eligible to retire are shown on the Rates of Disability table. The rates for disability were first used in the June 30, 2018 valuation.

The probabilities of withdrawal from service, death-in-service and disability are shown for sample ages on the Probabilities of Separation tables. The death-in-service and disability rates were first used in the June 30, 2018 valuation. The withdrawal rates were first used in the June 30, 2018 valuation.

The data about persons now covered and about present assets was furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary. Data was furnished as of May 31 and assumed to be statistically equivalent to June 30.

The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA).

Probabilities of Separation From Active Employment Less Than 5 Years of Service

Service	MoDOT, Civilian Patrol and MPERS Male	MoDOT, Civilian Patrol and MPERS Female	Uniformed Patrol Male	Uniformed Patrol Female
0-1	30.00%	20.00%	12.00%	12.00%
1-2	16.00	14.00	6.00	6.00
2-3	9.00	11.00	2.50	2.50
3-4	7.00	9.00	2.50	2.50
4-5	5.50	6.00	2.50	2.50

Probabilities of Separation From Active Employment More Than 5 Years of Service

Age	MoDOT, Civilian Patrol and MPERS Male	MoDOT, Civilian Patrol and MPERS Female	Uniformed Patrol Male	Uniformed Patrol Female
25	5.60%	6.00%	1.89%	1.89%
30	5.60	6.00	1.89	1.89
35	5.25	6.00	1.34	1.34
40	4.90	5.54	0.79	0.79
45	2.80	4.32	0.55	0.55
50	2.10	3.00	0.32	0.32
55	1.40	3.00	0.16	0.16
60	1.40	3.00	0.12	0.12

Salary Increase Assumptions
Service Based
% Merit Increases in Salaries Next Year

Service Index	MoDOT, Civilian Patrol and MPERS Rate	Uniformed Patrol Rate
1	6.80%	9.45%
2	4.50	5.00
3	2.80	2.75
4	1.50	2.50
5	1.00	2.00
6	0.80	1.50
7	0.00	1.25
8	0.00	1.25
9	0.00	1.00
10	0.00	0.75
11	0.00	0.75
12	0.00	0.75
13	0.00	0.50
14	0.00	0.50
15	0.00	0.25
16	0.00	0.25
17	0.00	0.25
18	0.00	0.25
19	0.00	0.25
20	0.00	0.25
21	0.00	0.00
22	0.00	0.00
23	0.00	0.00
24	0.00	0.00
25	0.00	0.00

Joint Life Retirement Values
(7.00% Interest)

Sample Attained Ages	Present Value of $1 Monthly for Life		Percent Dying Next Year		Future Life Expectancy (years)	
	Men	Women	Men	Women	Men	Women
50	$149.37	$153.84	0.3922%	0.2660%	32.36	34.85
55	142.00	147.02	0.5582%	0.3734%	28.05	30.34
60	132.97	138.52	0.7938%	0.5667%	23.89	25.97
65	122.06	128.13	1.1511%	0.8398%	19.90	21.76
70	109.01	115.45	1.7034%	1.2770%	16.11	17.74
75	93.80	100.44	2.6823%	2.0723%	12.58	13.97
80	76.99	83.55	4.5024%	3.5553%	9.41	10.56

The present values shown above are for illustrative purposes only and include a 50% survivor benefit but do not include the value of future post-retirement increases. Males are assumed to be 3 years older than their spouses.

Percent of Eligible Active Members Retiring Next Year (Rates of Retirement)

Closed and Year 2000 Plans

	MoDOT, Civilian Patrol and MPERS				Uniformed Patrol
	Male		Female		
Age	Normal	Early	Normal	Early	Normal
50	40.00%	0.00%	25.00%	0.00 %	45.00%
55	27.00	3.00	32.00	3.00	25.00
60	19.00	5.00	22.00	5.00	100.00
65	35.00	0.00	35.00	0.00	100.00
70	40.00	0.00	50.00	0.00	100.00

Year 2000 Plan – 2011 Tier

	MoDOT, Civilian Patrol and MPERS Normal		Uniformed Patrol	
Age	Age & Service	Rule of 90	Early	Normal
55	0.00%	30.00%	0.00%	30.00%
60	0.00	30.00	0.00	100.00
65	0.00	30.00	10.00	100.00
70	100.00	100.00	0.00	100.00

Percent of Members Becoming Disabled at the Indicated Age (Rates of Disability)

	MoDOT, Civilian Patrol and MPERS		Uniformed Patrol	
Age	Male	Female	Male	Female
25	0.08%	0.08%	0.10%	0.10%
30	0.10	0.10	0.10	0.10
35	0.13	0.13	0.10	0.10
40	0.17	0.17	0.10	0.10
45	0.27	0.27	0.10	0.10
50	0.46	0.46	0.10	0.10
55	0.86	0.86	0.10	0.10
60	1.49	1.49	0.10	0.10

Summary of Funding and Contributions

Schedule of Funding Progress

Year Ended June 30	Actuarial Asset Value	Accrued Liability – Entry Age	Unfunded Accrued Liability (UAAL)	Funded Ratio	Actuarial Covered Payroll[1]	UAAL as a Percentage of Covered Payroll
2009	1,471,496,660	3,113,393,645	1,641,896,985	47.26%	379,590,273	432.54%
2010[2]	1,375,844,573	3,258,866,925	1,883,022,352	42.22%	378,063,006	498.07%
2011	1,427,290,718	3,297,589,869	1,870,299,151	43.28%	362,654,376	515.72%
2012[2]	1,531,033,613	3,306,278,671	1,775,245,058	46.31%	341,637,559	519.63%
2013[2]	1,657,402,393	3,583,975,559	1,926,573,166	46.24%	329,481,506	584.73%
2014	1,795,264,291	3,650,241,741	1,854,977,450	49.18%	336,590,797	551.11%
2015	1,967,001,509	3,715,845,651	1,748,844,142	52.94%	342,264,593	510.96%
2016	2,086,654,348	3,761,733,004	1,675,078,656	55.47%	344,275,147	486.55%
2017	2,172,787,144	3,802,443,730	1,629,656,586	57.14%	356,142,973	457.58%
2018[2]	2,274,248,122	3,981,838,941	1,707,590,819	57.12%	353,371,000	483.23%

(1) Values are estimated from contribution rate and amount.
(2) New assumptions and/or methods adopted.

See Note 5 of Notes to the Financial Statement in the Financial Section for Funding policy information.

Member and Employer Contribution Rates

Year Ended June 30	Employer Contributions All Benefit Structures: Uniformed Patrol Group	Employer Contributions All Benefit Structures: Non-Uniformed Group	Member Contributions 2011 Tier All Groups
2009	40.22%	30.72%	4.00%
2010	39.95%	31.40%	4.00%
2011	49.53%	39.46%	4.00%
2012	58.63%	45.45%	4.00%
2013	55.03%	50.92%	4.00%
2014	55.23%	54.25%	4.00%
2015	58.19%	58.76%	4.00%
2016	57.76%	58.05%	4.00%
2017	58.00%	58.00%	4.00%
2018	58.00%	58.00%	4.00%

See Required Supplementary Information, Schedule of Employers' Contributions for more information.

Summary of Member Data Included In Valuations

	Non-Uniformed				
	Civilian Patrol	MoDOT and MPERS	Non-Uniformed Total	Uniformed Patrol	Grand Total
Active Members					
Closed Plan	284	1,605	1,889	534	2,423
Year 2000 Plan (also closed)	423	1,649	2,072	383	2,455
Year 2000 Plan - 2011 Tier (open)	407	1,792	2,199	314	2,513
Total Active Members	1,114	5,046	6,160	1,231	7,391
Total Active Members Prior Year	1,119	5,073	6,192	1,264	7,456
Retiree - Regular Pensioners					
Closed Plan	488	3,426	3,914	942	4,856
Year 2000 Plan (also closed)	566	3,343	3,909	6	3,915
Year 2000 Plan - 2011 Tier (open)	1	0	1	0	1
Total Regular Pensioners	1,055	6,769	7,824	948	8,772
Self Insured Disability Pensioners	3	43	46	3	49
Fully Insured Disability Pensioners	13	77	90	5	95
Terminated Vested Members	218	1,604	1,822	158	1,980
Total	**2,403**	**13,539**	**15,942**	**2,345**	**18,287**
Active Member Valuation Payroll	$47,859,971	$219,664,025	$267,523,996	$83,972,559	$351,496,555
Active Member Valuation Payroll Prior Year	$46,882,549	$216,529,976	$263,412,525	$85,566,687	$348,979,212
Unfunded Actuarial Accrued Liability	N/A	N/A	$1,247,028,653	$460,562,166	$1,707,590,819

Member data for actuarial valuation is as of May 31, 2018

Active Members By Attained Age and Years of Service

MoDOT and MPERS

Closed Plan

Attained Age	Counted by Complete Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
Under 20	-	-	-	-	-	-	-	0	$0
20-24	-	-	-	-	-	-	-	0	0
25-29	-	-	-	-	-	-	-	0	0
30-34	-	-	-	-	-	-	-	0	0
35-39	-	-	-	26	2	-	-	28	1,203,653
40-44	-	-	-	121	72	2	-	195	9,751,318
45-49	-	2	2	76	237	93	5	415	22,306,864
50-54	-	1	3	74	149	183	55	465	24,647,078
55-59	-	2	1	53	123	69	85	333	16,871,929
60-64	-	-	-	26	55	39	28	148	7,328,974
65-69	-	-	-	5	6	3	4	18	910,400
70+	-	-	-	-	-	-	3	3	319,801
Totals	**0**	**5**	**6**	**381**	**644**	**389**	**180**	**1,605**	**$83,340,017**

Average Age	**51.4 years**
Average Service	**24 years**
Average Pay	**$51,925**

Year 2000 Plan

Attained Age	Counted by Complete Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
Under 20	-	-	-	-	-	-	-	0	$0
20-24	-	-	-	-	-	-	-	0	0
25-29	1	9				-	-	10	369,099
30-34	7	59	84	1		-	-	151	6,637,135
35-39	3	55	185	78		-	-	321	14,761,419
40-44	14	52	125	99	1	-	-	291	12,886,106
45-49	8	52	118	77	2	-	-	257	10,977,039
50-54	3	29	97	84	1	-	-	214	8,847,843
55-59	9	36	113	94	-	3	-	255	10,363,803
60-64	3	23	70	30	1	-	-	127	5,081,230
65-69	1	2	12	6	-	-	1	22	884,841
70+	-	-	1	-	-	-	-	1	35,593
Totals	**49**	**317**	**805**	**469**	**5**	**3**	**1**	**1,649**	**$70,844,108**

Average Age	**46.3 years**
Average Service	**12.8 years**
Average Pay	**$42,962**

Member data for actuarial valuation is as of May 31, 2018

Active Members By Attained Age and Years of Service

MoDOT and MPERS

Year 2000 Plan - 2011 Tier

Attained Age	Counted by Complete Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
Under 20	5	-	-	-	-	-	-	5	$150,158
20-24	185		-	-	-	-	-	185	6,579,889
25-29	377	27	-	-	-	-	-	404	15,528,474
30-34	261	49	-	-	-	-	-	310	11,527,509
35-39	220	34	-	-	-	-	-	254	8,824,008
40-44	152	14	-	-	-	-	-	166	6,100,305
45-49	149	15	-	-	-	-	-	164	5,983,853
50-54	111	21	-	-	-	-	-	132	4,682,669
55-59	89	27	-	-	-	-	-	116	4,069,221
60-64	34	11	-	-	-	-	-	45	1,615,548
65-69	5	2	-	-	-	-	-	7	265,911
70+	3	1	-	-	-	-	-	4	152,355
Totals	**1,591**	**201**	**0**	**0**	**0**	**0**	**0**	**1,792**	**$65,479,900**

Average Age	**36.9 years**
Average Service	**2.7 years**
Average Pay	**$36,540**

Member data for actuarial valuation is as of May 31, 2018.

Active Members By Attained Age and Years of Service

Uniformed Patrol

Closed Plan

Attained Age	Counted by Complete Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
Under 20	-	-	-	-	-	-	-	0	$0
20-24	-	-	-	-	-	-	-	0	0
25-29	-	-	-	-	-	-	-	0	0
30-34	-	-	-	-	-	-	-	0	0
35-39	-	1	-	2	-	-	-	3	209,147
40-44	-	-	-	27	45	-	-	72	5,773,527
45-49	-	-	1	17	170	23	-	211	17,231,903
50-54	1	-	-	5	74	85	17	182	15,092,677
55-59	-	-	-	1	14	21	29	65	5,546,480
60-64	-	-	-	-	-	1	-	1	77,256
65-69	-	-	-	-	-	-	-	0	0
70+	-	-	-	-	-	-	-	0	0
Totals	**1**	**1**	**1**	**52**	**303**	**130**	**46**	**534**	**$43,930,990**

Average Age **49.2 years**
Average Service **24.2 years**
Average Pay **$82,268**

Year 2000 Plan

Attained Age	Counted by Complete Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
Under 20	-	-	-	-	-	-	-	0	$0
20-24	-	-	-	-	-	-	-	0	0
25-29	-	3			-	-	-	3	173,374
30-34	-	57	45		-	-	-	102	5,951,663
35-39	-	15	92	25	-	-	-	132	8,504,481
40-44	-	8	25	63	-	-	-	96	6,606,409
45-49	-	4	12	23	-	-	-	39	2,550,046
50-54	-		5	5	-	-	-	10	646,040
55-59	-	-	-	-	-	1	-	1	75,300
60-64	-	-	-	-	-	-	-	0	0
65-69	-	-	-	-	-	-	-	0	0
70+	-	-	-	-	-	-	-	0	0
Totals	**0**	**87**	**179**	**116**	**0**	**1**	**0**	**383**	**$24,507,313**

Average Age **38.3 years**
Average Service **12.7 years**
Average Pay **$63,988**

Member data for actuarial valuation is as of May 31, 2018.

Active Members By Attained Age and Years of Service

Uniformed Patrol

Year 2000 Plan - 2011 Tier

Attained Age	Counted by Complete Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
Under 20	-	-	-	-	-	-	-	0	$0
20-24	37	-	-	-	-	-	-	37	1,765,864
25-29	101	50	-	-	-	-	-	151	7,358,632
30-34	33	52	-	-	-	-	-	85	4,361,705
35-39	14	12	-	-	-	-	-	26	1,284,767
40-44	4	4	-	-	-	-	-	8	404,555
45-49	1	5	-	-	-	-	-	6	307,713
50-54	-	1	-	-	-	-	-	1	51,020
55-59	-	-	-	-	-	-	-	0	0
60-64	-	-	-	-	-	-	-	0	0
65-69	-	-	-	-	-	-	-	0	0
70+	-	-	-	-	-	-	-	0	0
Totals	**190**	**124**	**0**	**0**	**0**	**0**	**0**	**314**	**$15,534,256**

Average Age	**29.5 years**
Average Service	**4.1 years**
Average Pay	**$49,472**

Member data for actuarial valuation is as of May 31, 2018.

Active Members By Attained Age and Years of Service

Civilian Patrol

Closed Plan

Attained Age	Counted by Complete Years of Service to Valuation Date 0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals No.	Totals Valuation Payroll
Under 20	-	-	-	-	-	-	-	0	$0
20-24	-	-	-	-	-	-	-	0	0
25-29	-	-	-	-	-	-	-	0	0
30-34	-	-	-	-	-	-	-	0	0
35-39	-	-	1	3	2	-	-	6	236,724
40-44	-	-	1	14	17	-	-	32	1,571,474
45-49	-	2	1	10	31	11	-	55	2,721,382
50-54	-	1	2	10	38	27	13	91	4,561,381
55-59	-	3	-	8	21	17	20	69	3,321,879
60-64	-	-	-	5	12	3	3	23	1,049,575
65-69	-	-	-	1	1	0	4	6	278,604
70+	-	-	-	-	1	1	-	2	72,949
Totals	**0**	**6**	**5**	**51**	**123**	**59**	**40**	**284**	**$13,813,968**

Average Age	**52.1 years**
Average Service	**24 years**
Average Pay	**$48,641**

Year 2000 Plan

Attained Age	Counted by Complete Years of Service to Valuation Date 0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals No.	Totals Valuation Payroll
Under 20	-	-	-	-	-	-	-	0	$0
20-24	-	-	-	-	-	-	-	0	0
25-29	1	4	-	-	-	-	-	5	187,798
30-34	2	34	16	1	-	-	-	53	2,390,971
35-39	2	17	50	19	-	-	-	88	4,676,793
40-44	4	8	34	19	-	-	-	65	3,143,001
45-49	1	13	22	17	1	-	-	54	2,356,077
50-54	3	9	28	18	-	-	-	58	2,526,415
55-59	2	17	14	20	3	-	-	56	2,367,807
60-64	-	5	13	9	-	-	-	27	1,023,051
65-69	1	4	1	7	-	-	-	13	467,086
70+	-	1	1	2	-	-	-	4	139,525
Totals	**16**	**112**	**179**	**112**	**4**	**0**	**0**	**423**	**$19,278,524**

Average Age	**45.9 years**
Average Service	**12.2 years**
Average Pay	**$45,576**

Member data for actuarial valuation is as of May 31, 2018.

Active Members By Attained Age and Years of Service

Civilian Patrol

Year 2000 Plan - 2011 Tier

Attained Age	Counted by Complete Years of Service to Valuation Date 0-4	5-9	10-14	15-19	20-24	25-29	30+	Totals No.	Valuation Payroll
Under 20	-	-	-	-	-	-	-	0	$0
20-24	38	-	-	-	-	-	-	38	1,218,998
25-29	74	14	-	-	-	-	-	88	3,363,449
30-34	46	30	-	-	-	-	-	76	3,074,154
35-39	33	7	-	-	-	-	-	40	1,450,101
40-44	21	10	-	-	-	-	-	31	1,119,410
45-49	32	10	-	-	-	-	-	42	1,440,302
50-54	30	9	-	-	-	-	-	39	1,398,991
55-59	20	5	-	-	-	-	-	25	822,282
60-64	13	8	-	-	-	-	-	21	650,551
65-69	4	3	-	-	-	-	-	7	229,241
70+	-	-	-	-	-	-	-	0	0
Totals	**311**	**96**	**0**	**0**	**0**	**0**	**0**	**407**	**$14,767,479**

Average Age	**38.4 years**
Average Service	**3.2 years**
Average Pay	**$36,284**

Member data for actuarial valuation is as of May 31, 2018.

Schedule of Active Member Valuation Data

Actuarial Valuation for June 30,	Number of Participating Employers	Number of Active Members	Covered Payroll	Average Pay	Percent Change in Average Pay from Prior Year
2009	3	8,784	377,652,245	42,993	0.1%
2010	3	8,457	369,911,252	43,740	1.7%
2011	3	8,231	361,639,001	43,936	0.4%
2012	3	7,458	329,293,168	44,153	0.5%
2013	3	7,319	323,205,767	44,160	0.0%
2014	3	7,390	332,085,689	44,937	1.8%
2015	3	7,358	334,400,980	45,447	1.1%
2016	3	7,441	339,799,379	45,666	0.5%
2017	3	7,456	348,979,212	46,805	2.5%
2018	3	7,391	351,496,555	47,557	1.6%
				Ten-Year Average	**1.0%**

Member data for actuarial valuation is as of May 31, 2018.

Solvency Test

The MPERS funding objective is to meet long term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to the System are level in concept and soundly executed, the System ***will pay all promised benefits when due – the ultimate test of financial soundness.***

A solvency test is one means of checking a system's progress under its funding program. In a solvency test for a non-contributory plan, the plan's present assets (cash and investments) are compared with: 1) The liabilities for future benefits to present retired lives and 2) The liabilities for service already rendered by members. In a system that has been following the discipline of level percent of payroll financing, the liabilities for future benefits to present retired lives (liability 1) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by members (liability 2) will be partially covered by the remainder of present assets. The larger the funded portion of liability 2, the stronger the condition of the system.

The schedule below illustrates the history of liability 2 of the System.

Valuation Date June 30	(1) Member Contributions	(2) Retirees and Beneficiaries	(3) Active and Inactive Members	Present Valuation Assets	Portion of Present Values Covered by Present Assets			
					(1)	(2)	(3)	Total
	------------------------*Millions*------------------------							
2009	0	1,947	1,166	1,471	100%	76%	0%	47%
2010*	0	2,034	1,225	1,376	100%	68%	0%	42%
2011	0	2,045	1,253	1,427	100%	70%	0%	43%
2012*	0	2,133	1,173	1,531	100%	72%	0%	46%
2013*	1	2,333	1,250	1,657	100%	71%	0%	46%
2014	2	2,384	1,264	1,795	100%	75%	0%	49%
2015	3	2,444	1,269	1,967	100%	80%	0%	53%
2016	5	2,470	1,287	2,087	100%	84%	0%	55%
2017	8	2,488	1,306	2,173	100%	87%	0%	57%
2018*	11	2,598	1,373	2,274	100%	87%	0%	57%

** New assumptions and/or methods adopted.*

Derivation of Financial Experience

Actual experience will never coincide exactly with assumed experience (except by coincidence). Gains and losses may offset each other over a period of years, but sizeable year-to-year variations from assumed experience are common. Detail on the derivation of the experience gain (loss) is shown below.

UAAL Beginning of Year (at July 1)	$1,629,656,586
Normal Cost	50,991,818
Contributions	(211,824,044)
Interest	120,066,137
Net Change in LTD Assets	-
Expected UAAL Before Any Changes	1,588,890,497
Effect of Data Improvements*	81,024
Effect of Changes in Assumptions & Methods	142,475,085
Effect of Adjustment	-
Expected UAAL After Changes	1,731,446,606
End of Year UAAL (at June 30)	1,707,590,819
Gain/(Loss) for Year	$23,855,787
Gain/(Loss) as a percent of actuarial accrued liabilities at start of year ($3,715.8 million)	0.6%

**Result of receiving disability information on retired members who are at or past normal retirement age.*

Valuation Date June 30	**Experience Gain (Loss) as % of Beginning Accrued Liability**
2009	(12.6)%
2010	(3.8)%
2011	2.2%
2012	3.2%
2013	2.1%
2014	2.1%
2015	2.4%
2016	1.1%
2017	0.1%
2018	0.6%

Schedule of Retirees and Beneficiaries Added and Removed

Valuation Date	Added to Rolls: Number	Added to Rolls: Annual Allowances	Removed from Rolls: Number	Removed from Rolls: Annual Allowances	Rolls End of Year: Number	Rolls End of Year: Annual Allowances	Average Annual Allowances	% Increase in Annual Allowance	% Increase in Average Annual Allowance
FY2018									
Retirees	311	$3,842,195	201	$2,780,558	6,956	$193,705,411	$27,847	1.96%	0.34%
Beneficiaries	112	1,103,494	124	855,794	1,863	$34,930,984	18,750	1.97%	2.62%
Disabilities	18	0	25	26,921	148	$845,327	5,712	-2.82%	2.44%
FY2017									
Retirees	352	$4,642,501	196	$3,023,457	6,846	$189,990,373	$27,752	1.29%	-1.02%
Beneficiaries	127	1,536,955	134	1,099,249	1,875	$34,257,599	18,271	3.49%	3.88%
Disabilities	24	0	24	15,898	155	$869,833	5,576	-3.92%	-4.54%
FY2016									
Retirees	300	$3,820,071	193	$3,032,208	6,690	$187,571,039	$28,038	2.31%	0.68%
Beneficiaries	129	1,205,294	121	889,494	1,882	33,100,896	17,588	3.18%	2.74%
Disabilities	20	0	29	5,787	155	905,306	5,841	0.21%	6.05%
FY2015									
Retirees	406	$4,669,565	188	$2,712,395	6,583	$183,337,549	$27,850	2.61%	-0.79%
Beneficiaries	113	1,290,336	139	900,991	1,874	32,080,172	17,119	2.65%	4.07%
Disabilities	21	0	30	22,387	164	903,386	5,508	-3.43%	1.87%
FY2014									
Retirees	307	$4,434,888	176	$2,317,420	6,365	$178,670,075	$28,071	3.54%	1.41%
Beneficiaries	112	1,163,441	126	863,108	1,900	31,253,184	16,449	3.91%	4.68%
Disabilities	19	6,760	25	19,831	173	935,492	5,407	3.41%	6.40%
FY2013									
Retirees	395	$5,001,943	174	$2,761,791	6,234	$172,564,478	$27,681	4.56%	0.85%
Beneficiaries	130	1,349,835	96	717,434	1,914	30,077,515	15,714	6.79%	5.00%
Disabilities	27	0	23	6,788	179	904,683	5,082	-1.88%	-3.00%
FY2012									
Retirees	413	$5,988,784	171	$2,119,116	6,013	$165,042,751	$27,448	4.10%	-0.09%
Beneficiaries	130	1,206,259	105	610,931	1,880	28,166,374	14,966	5.20%	3.69%
Disabilities	34	0	25	16,712	175	922,027	5,239	0.39%	-5.31%
FY2011									
Retirees	311	$3,955,409	146	$2,406,006	5,771	$158,543,113	$27,472	0.74%	-2.14%
Beneficiaries	102	891,718	109	710,880	1,855	26,772,995	14,433	-1.17%	-0.79%
Disabilities	38	0	14	10,399	166	918,403	5,533	1.69%	-13.00%
FY2010									
Retirees	272	$3,218,890	137	$3,252,182	5,606	$157,380,575	$28,074	3.29%	0.80%
Beneficiaries	103	930,442	104	625,292	1,862	27,089,491	14,549	5.79%	5.85%
Disabilities	21	0	25	73,638	142	903,107	6,360	-40.95%	-39.29%
FY2009									
Retirees	292	$4,125,644	178	$2,136,578	5,471	$152,372,034	$27,851	4.49%	2.31%
Beneficiaries	138	1,134,755	108	622,167	1,863	25,606,266	13,745	7.80%	6.07%
Disabilities	19	0	28	71,381	146	1,529,412	10,475	-11.67%	-6.23%

**New disabilities are covered / paid by the Standard Insurance Co.*
Data of this chart is As of June 30, 2018.

Summary of Plan Provisions *

For the Year Ended June 30, 2018

Plan Provision	Closed Plan	Year 2000 Plan	Year 2000 Plan - 2011 Tier
Membership Eligibility	• Members hired prior to July 1, 2000, who became vested, and worked or continue to work in a position normally requiring at least 1,040 hours of work annually	• Members hired for the first time on or after July 1, 2000, in a position normally requiring at least 1,040 hours of work annually • Members who left state employment prior to becoming vested and return to work (for 12 continuous months) on or after July 1, 2000, in a position normally requiring at least 1,040 hours of work annually	• Members hired for the first time on or after January 1, 2011, in a position normally requiring at least 1,040 hours of work annually • Members who have never worked for a state agency covered by MPERS or MOSERS prior to January 1, 2011
Normal Retirement Eligibility	• Age 65 & active with 4 years of service • Age 65 with 5 years of service • Age 60 with 15 years of service • "Rule of 80"/minimum age 48 Uniformed Members Only: • Age 55 & active with 4 years of service • Age 55 with 5 years of service • Mandatory retirement at age 60; no minimum service requirement (active only)	• Age 62 with 5 years of service • "Rule of 80"/minimum age 48 Uniformed Members Only: • Mandatory retirement at age 60; no minimum service requirement (active only)	• Age 67 with 5 years of service • "Rule of 90"/minimum age 55 Uniformed Members Only: • Age 55 & active with 5 years of creditable service (active only) • Mandatory retirement at age 60; no minimum service requirement (active only)
Early (Reduced) Retirement Eligibility	• Age 55 with 10 years creditable service	• Age 57 with 5 years creditable service	• Age 62 & active with 5 years of creditable service (active only)
Benefit Life Benefit	16% x FAP** x service (base benefit is increased by 33 1/2% for uniformed patrol members only)	17% x FAP** x service	17% x FAP** x service
Temporary Benefit	Not available	08% x FAP** x service Until age 62, only if retiring under "Rule of 80"	08% x FAP** x service Until age 62, only if retiring under "Rule of 90"
Special Benefit	Uniformed Members Only: $90/mo payable until age 65, offset by any amount earned from gainful employment (does not apply if hired on or after January 1, 1995)	Uniformed Members Only: Until age 62, if retiring under "Rule of 80" or at mandatory age 60	Uniformed Members Only: Until age 62, if retiring under either normal retirement eligibility provision
Death Benefit	$5,000 benefit paid to named beneficiary • Available to retirees who retired after September 28, 1985 • Available work-related disability recipients after September 28, 1985	$5,000 benefit paid to named beneficiary • Available to retirees who retired after September 28, 1985 • Available work-related disability recipients after September 28, 1985	$5,000 benefit paid to named beneficiary • Available to retirees who retired after September 28, 1985 • Available work-related disability recipients after September 28, 1985
Vesting	5 years of service	5 years of service	5 years of service, if active on or after January 1, 2018

Summary of Plan Provisions *

Comparison of the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan - 2011 Tier
For the Year Ended June 30, 2018

Plan Provision	Closed Plan	Year 2000 Plan	Year 2000 Plan - 2011 Tier
Cost-of-Living Allowance (COLA)	• If hired before August 28, 1997, annual COLA is a minimum of 4%, and maximum of 5%, based on 80% of the increase in the CPI-U over the previous year, up to a maximum of 65% of original benefit. • After 65% cap is reached, annual COLA increase will be equal to 80% of the change in the CPI-U, with a maximum of 5%. • If hired on or after August 28, 1997, annual COLA is equal to 80% of the change in the CPI-U, with a maximum rate of 5%.	• Annual COLA is equal to 80% of the change in the CPI-U with a maximum rate of 5%.	• Annual COLA is equal to 80% of the change in the CPI-U with a maximum rate of 5%.
Survivor Benefit (death before retirement) Non Duty-Related Death	• Survivor benefit to eligible spouse calculated using the Joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21. • If at least 3, but less than 5, years of service, the survivor benefit is calculated using 25% of the member's base benefit calculated as if the member retired on his/her date of death.	• Survivor benefit to eligible spouse calculated using the joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21.	• Survivor benefit to eligible spouse calculated using the joint & 100% survivor option or 80% of the member's life income annuity paid to eligible children under age 21.
Duty-Related Death	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement).	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement).	• Survivor benefit to eligible spouse or children no less than 50% of final average pay (no minimum service requirement).
Optional Forms of Payment	Payment options include: • Life income annuity • Unreduced joint & 50% survivor • Joint & 100% survivor • 60 or 120 guaranteed payments • BackDROP	Payment options include: • Life income annuity • Joint & 50% survivor • Joint & 100% survivor • 120 or 180 guaranteed payments • BackDROP	Payment options include: • Life income annuity • Joint & 50% survivor • Joint & 100% survivor • 120 or 180 guaranteed payments
Disability	Long-term disability and work-related disability	Long-term disability and work-related disability	Long-term disability and work-related disability
Employee Contributions	Non-contributory	Non-contributory	4% of gross pay

**This summary describes the plan provisions in chapter 104 of the Missouri Revised Statutes. It does not overrule any other applicable statute or administrative rule and, in the event of a conflict, the applicable statute or rule would apply. The Year 2000 Plan was effective July 1, 2000 and the Year 2000 Plan – 2011 Tier was effective January 1, 2011. A complete summary is available at the MPERS office.*

***Final average pay (FAP) – average of highest 36 consecutive months of pay.*

See Note 2 of Notes to the Financial Statements for more information.

Legislative Changes

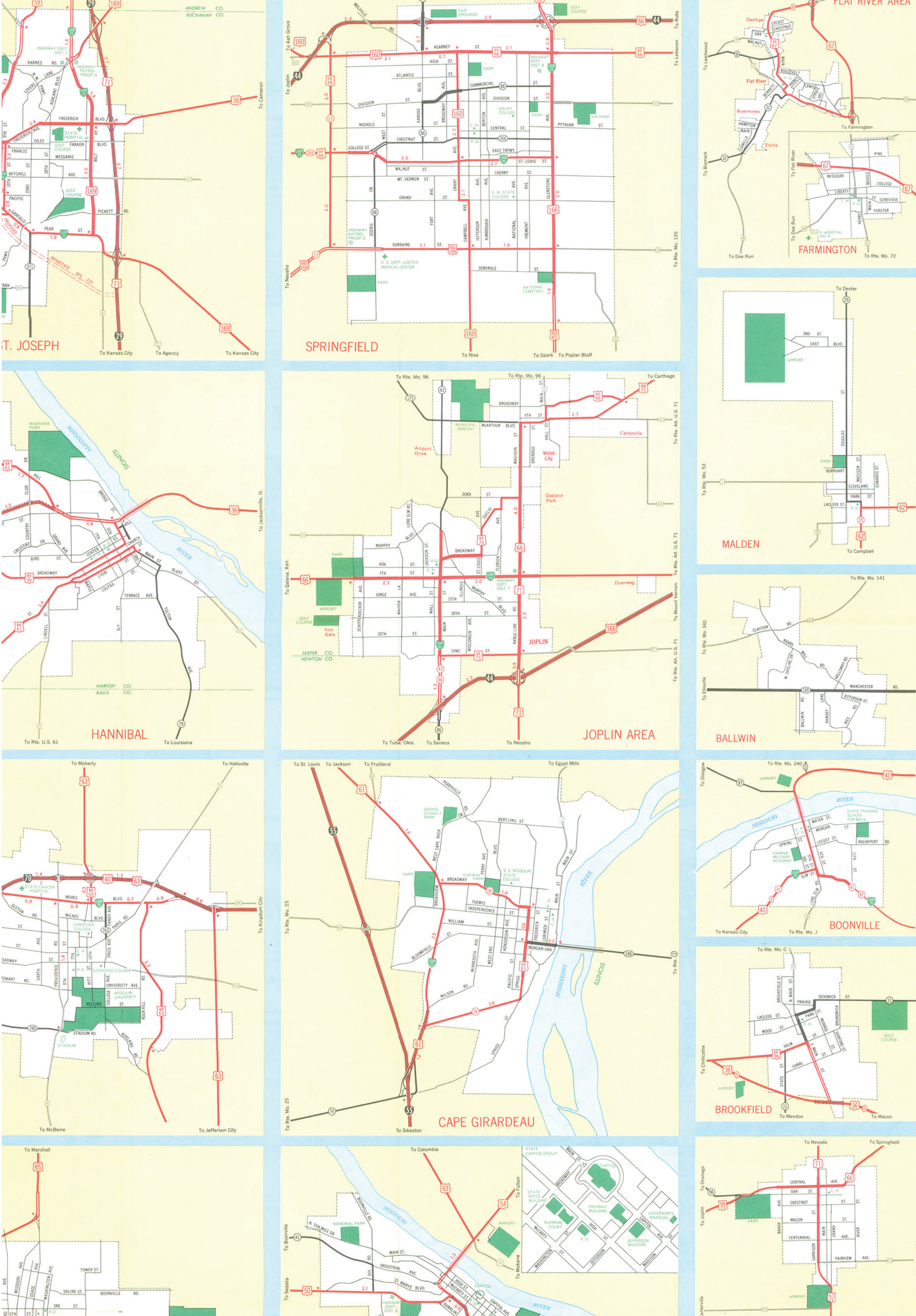
Senate Committee Substitute for Senate Revision Bills 975 & 1024 was signed by the Governor on July 1, 2018. Conference Committee Substitute for House Committee Substitute for Senate Substitute for Senate Bill 870, was signed by the Governor on July 9, 2018.

Provisions of the revision bills repealed and corrected ineffective provisions of our governing statutes.

Passage of the bill poses no fiscal or administrative impact to the System.

Provisions of the second bill lowered the continuing education requirement for trustees from six hours to two hours subsequent to their orientation as a trustee.

Notes


ST. JOSEPH
SPRINGFIELD
FLAT RIVER AREA
FARMINGTON
MALDEN
HANNIBAL
JOPLIN AREA
BALLWIN
BOONVILLE
CAPE GIRARDEAU
BROOKFIELD

Statistical Summary

Changes in Net Position
The chart on page 74 details a 10-year history of the additions (revenues) and deductions (expenses) of MPERS.

The chart on page 75 details a 10-year history of benefit payments by type.

Plan Membership
Overall, MPERS' membership decreased by 279. Retired members and their beneficiaries increased by 91, terminated-vested members decreased by 334, and active members decreased by 36. The teminated vested membership decrease was due to a one-time buy-out program.

The charts beginning on page 77 detail the number of retired members by type of benefit and the average monthly benefit payments.

Other charts and graphs in this section detail demographic information concerning our members and employers.

All non-accounting data in this section was derived from internal sources and the annual actuarial valuation reports. Member data may differ between some schedules since the valuations are performed using data as of May 31 each year.

Changes in Net Position

MoDOT and Patrol Employees' Retirement System
Changes in Net Position, Last Ten Fiscal Years

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Additions										
Employer Contributions	$122,599,301	$124,052,534	$150,022,169	$164,880,140	$170,836,117	$183,353,841	$200,638,571	$199,609,396	$206,562,924	204,955,180
Employee Contributions [1]	0	0	45,361	202,843	503,550	1,282,379	2,086,000	2,503,824	3,238,502	3,721,983
Transfers from Other Systems [2]	0	0	17,609,276	264,954	1,727,834	1,784,382	1,114,437	2,729,679	1,752,050	1,867,445
Other Contributions	444,000	424,172	453,984	908,898	635,900	978,184	1,208,162	978,689	1,645,487	1,279,434
Net Investment Income	(426,265,311)	166,307,054	279,612,052	42,091,564	198,139,438	319,445,655	92,645,423	21,432,090	220,301,127	197,619,367
Other Income	33,571	33,145	33,141	13,760	1,650	125	148	5	614	472
Total Additions to Fiduciary Net Position	(303,188,439)	290,816,905	447,775,983	208,362,159	371,844,489	506,844,566	297,692,741	227,253,683	433,500,704	409,443,881
Deductions										
Benefit Payments	192,013,250	196,721,274	202,153,768	219,704,320	224,518,100	231,384,708	241,714,876	240,176,011	251,284,152	259,058,863
Administrative Expenses	2,339,501	2,512,181	2,658,849	2,934,969	2,997,225	3,736,355	4,066,944	4,370,860	4,515,458	4,693,492
Total Deductions from Fiduciary Net Position	194,352,751	199,233,455	204,812,617	222,639,289	227,515,325	235,121,063	245,781,820	244,546,871	255,799,610	263,752,355
Change in Net Position	**$(497,541,190)**	**$91,583,450**	**$242,963,366**	**$(14,277,130)**	**$144,329,164**	**$271,723,503**	**$51,910,921**	**($17,293,188)**	**$177,701,094**	**$145,691,526**

(1) Employee contributions began January 1, 2011 for members in the Year 2000 Plan - 2011 Tier.
(2) 2011 transfer from MOSERS for Water Patrol employees.

Benefit Payments By Type

MoDOT and Patrol Employees' Retirement System
Benefit Payments by Type, Last Ten Fiscal Years

Type of Benefit	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Age and Service Benefits:										
Retiree and Survivor Annuity Payments	$175,588,494	$183,103,253	$188,171,369	$195,964,396	$205,617,640	$212,840,210	$218,827,986	$224,098,038	$227,997,513	237,850,981
BackDROP Payments	12,859,452	10,358,181	10,792,932	18,138,891	13,426,923	13,438,730	16,366,338	10,677,166	16,887,349	14,546,108
Disability Benefits:										
Long-Term Disability	179,239	137,624	101,875	85,240	79,964	79,184	76,061	66,389	60,352	49,613
Work-Related Disability	692,043	664,469	648,320	668,821	691,227	774,541	716,047	718,009	707,953	714,197
Normal Disability	186,349	163,485	167,427	166,140	138,281	121,872	108,891	109,027	109,455	110,310
Insured Disability	1,847,673	1,759,262	1,696,845	1,592,517	1,512,685	1,531,578	1,554,676	1,567,825	1,620,418	1,601,605
Death Benefits	660,000	535,000	575,000	675,000	665,000	703,571	810,000	820,000	855,153	860,000
Service Transfer Payments(2)	0	0	0	2,410,526	2,357,080	1,876,336	3,147,482	1,921,451	2,724,631	2,823,042
Employee Contribution Refunds (1)	0	0	0	2,789	29,300	18,686	107,395	198,106	321,328	503,007
Total Benefits	**$192,013,250**	**$196,721,274**	**$202,153,768**	**$219,704,320**	**$224,518,100**	**$231,384,708**	**$241,714,876**	**$240,176,011**	**$251,284,152**	**$259,058,863**

(1) Employee contributions began January 1, 2011 for members in the Year 2000 Plan - 2011 Tier.
(2) Reciprocal transfer legislation enacted effective August 28, 2011.

BUDGET TO ACTUAL REPORT

As of June 30, 2018

	Annual Budget	Actual Year End	Actual % Spent	Budget Variance Favorable (Unfavorable)
Administrative Expenses				
Salary/Benefits	$ 1,900,793	$ 1,864,585	98.1%	$ 36,208
Professional Services	257,900	276,450	107.2%	(18,550)
Meetings/Travel/Education	31,493	19,334	61.4%	12,159
Member Education	19,450	11,183	57.5%	8,267
Office Supplies	6,500	2,845	43.8%	3,655
Printing/Postage	38,150	32,661	85.6%	5,489
Membership Dues/Subscriptions	18,315	13,323	72.7%	4,992
Utilities	40,220	38,241	95.1%	1,979
Building Expenses/Maintenance	43,420	33,884	78.0%	9,536
Rental/Lease	8,150	7,792	95.6%	358
Equipment/Furniture	7,400	5,489	74.2%	1,911
Information Technology	282,613	306,395	108.4%	(23,782)
Administrative Sub-total	$ 2,654,404	$ 2,612,182	98.4%	$ 42,222
Investment Expenses				
Salary/Benefits	$1,656,076	1,597,586	96.5%	58,490
Investment Services	351,500	342,212	97.4%	9,288
Meetings/Travel/Education	63,650	58,275	91.6%	5,375
Direct Operating Expenses	43,200	42,750	99.0%	450
Investment Sub-total	$2,114,426	$ 2,040,823	96.5%	$ 73,603
TOTALS	**$4,768,830**	**$4,653,005**	**97.6%**	**$115,825**

Reconciliation to Statement of Changes in Fiduciary Net Position, Administrative Expenses:

Total Administrative Expenses, page 8	$4,693,492
Investment General Consultant	327,212
Actuarial Experience Study	36,000
Depreciation Expense	(345,771)
OPEB Expense	(92,018)
OPEB Deferred Outflow	34,090
Capitalized Equipment Costs	0
	$4,653,005

Schedule of Retired Members By Type of Benefit

All Members*

Amount of Monthly Benefit	Retirement: Normal	Retirement: Early	Disability: Normal	Disability: Work-Related	Disability: Long-Term	Survivor	Total Recipients
1 - 200	25	100	3	24	75	83	310
201 - 400	183	204	3	0	4	160	554
401 - 600	188	181	1	0	3	153	526
601 - 800	190	104	1	0	0	185	480
801 - 1000	161	57	3	2	1	152	376
1001 - 1200	264	36	1	1	0	139	441
1201 - 1400	349	16	0	1	0	131	497
1401 - 1600	438	10	1	1	0	119	569
1601 - 1800	451	8	1	2	0	94	556
1801 - 2000	477	3	0	6	0	81	567
2001 - 2200	390	2	0	2	0	77	471
2201 - 2400	306	0	0	4	0	72	382
2401 - 2600	311	2	0	2	0	62	377
2601 - 2800	264	0	0	1	0	51	316
2801 - 3000	277	0	0	2	0	50	329
> 3000	1,956	3	0	3	0	254	2,216
TOTALS	**6,230**	**726**	**14**	**51**	**83**	**1,863**	**8,967**

* This chart includes ten retirement system staff retirees

MoDOT

Amount of Monthly Benefit	Retirement: Normal	Retirement: Early	Disability: Normal	Disability: Work-Related	Disability: Long-Term	Survivor	Total Recipients
1 - 200	17	76	3	20	61	76	253
201 - 400	140	167	3	0	3	141	454
401 - 600	138	153	1	0	2	133	427
601 - 800	139	94	1	0	0	162	396
801 - 1000	110	50	3	2	1	132	298
1001 - 1200	205	28	1	1	0	123	358
1201 - 1400	289	14	0	1	0	117	421
1401 - 1600	372	9	1	1	0	93	476
1601 - 1800	372	8	1	2	0	80	463
1801 - 2000	409	3	0	6	0	73	491
2001 - 2200	329	2	0	1	0	63	395
2201 - 2400	261	0	0	3	0	53	317
2401 - 2600	269	2	0	1	0	43	315
2601 - 2800	225	0	0	1	0	30	256
2801 - 3000	241	0	0	2	0	30	273
> 3000	1,137	2	0	2	0	186	1,327
TOTALS	**4,653**	**608**	**14**	**43**	**67**	**1,535**	**6,920**

Schedule of Retired Members By Type of Benefit

Uniformed Patrol

Amount of Monthly Benefit	Retirement Normal	Retirement Early	Disability Normal	Disability Work-Related	Disability Long-Term	Survivor	Total Recipients
1 - 200	0	0	0	3	2	1	6
201 - 400	4	0	0	0	0	5	9
401 - 600	9	0	0	0	0	5	14
601 - 800	14	0	0	0	0	3	17
801 - 1000	8	0	0	0	0	9	17
1001 - 1200	8	0	0	0	0	1	9
1201 - 1400	4	0	0	0	0	3	7
1401 - 1600	4	0	0	0	0	10	14
1601 - 1800	0	0	0	0	0	7	7
1801 - 2000	2	0	0	0	0	3	5
2001 - 2200	4	0	0	1	0	11	16
2201 - 2400	0	0	0	1	0	14	15
2401 - 2600	4	0	0	0	0	15	19
2601 - 2800	4	0	0	0	0	19	23
2801 - 3000	2	0	0	0	0	19	21
> 3000	700	0	0	1	0	63	764
TOTALS	**767**	**0**	**0**	**6**	**2**	**188**	**963**

Civilian Patrol

Amount of Monthly Benefit	Retirement Normal	Retirement Early	Disability Normal	Disability Work-Related	Disability Long-Term	Survivor	Total Recipients
1 - 200	7	24	0	1	12	6	50
201 - 400	39	37	0	0	1	14	91
401 - 600	41	28	0	0	1	15	85
601 - 800	37	10	0	0	0	20	67
801 - 1000	43	7	0	0	0	11	61
1001 - 1200	51	8	0	0	0	15	74
1201 - 1400	56	2	0	0	0	11	69
1401 - 1600	61	1	0	0	0	16	78
1601 - 1800	79	0	0	0	0	7	86
1801 - 2000	66	0	0	0	0	5	71
2001 - 2200	56	0	0	0	0	3	59
2201 - 2400	45	0	0	0	0	5	50
2401 - 2600	38	0	0	1	0	4	43
2601 - 2800	35	0	0	0	0	2	37
2801 - 3000	34	0	0	0	0	1	35
> 3000	113	0	0	0	0	5	118
TOTALS	**801**	**117**	**0**	**2**	**14**	**140**	**1,074**

Schedule of Average Monthly Benefit Payments

MoDOT

By Years of Service

Retired In Fiscal Year		0 - 10	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41+
2009	**Average Benefit**	**$322**	**730**	**1,187**	**1,548**	**2,145**	**2,556**	**2,587**	**4,139**
2009	Average FAP	$2,507	2,922	3,290	3,518	3,505	3,679	3,920	4,865
2009	**Current Retirees**	**25**	**17**	**15**	**37**	**42**	**44**	**16**	**4**
2010	**Average Benefit**	**$303**	**621**	**1,307**	**1,621**	**2,342**	**2,844**	**2,978**	**3,893**
2010	Average FAP	$2,319	2,524	3,231	3,513	3,674	3,944	4,015	4,008
2010	**Current Retirees**	**24**	**22**	**14**	**38**	**59**	**40**	**3**	**3**
2011	**Average Benefit**	**$335**	**648**	**1,137**	**1,656**	**2,660**	**3,071**	**3,177**	**4,592**
2011	Average FAP	$2,663	2,651	3,128	3,585	3,923	3,932	3,863	4,167
2011	**Current Retirees**	**21**	**33**	**22**	**42**	**64**	**35**	**6**	**3**
2012	**Average Benefit**	**$360**	**562**	**1,170**	**1,618**	**2,897**	**3,278**	**2,787**	**0**
2012	Average FAP	$3,148	2,820	3,447	3,438	4,190	4,272	3,777	0
2012	**Current Retirees**	**33**	**22**	**37**	**61**	**103**	**56**	**3**	**0**
2013	**Average Benefit**	**$307**	**596**	**1,280**	**1,763**	**3,021**	**3,146**	**5,278**	**2,765**
2013	Average FAP	$2,691	2,917	3,521	3,793	4,335	3,982	5,516	2,802
2013	**Current Retirees**	**32**	**36**	**42**	**66**	**98**	**27**	**2**	**1**
2014	**Average Benefit**	**$306**	**691**	**1,183**	**1,821**	**3,128**	**3,685**	**2,805**	**0**
2014	Average FAP	$2,444	3,069	3,493	3,849	4,509	4,606	3,781	0
2014	**Current Retirees**	**27**	**24**	**19**	**43**	**75**	**14**	**2**	**0**
2015	**Average Benefit**	**$322**	**629**	**1,139**	**1,841**	**3,004**	**3,537**	**3,048**	**0**
2015	Average FAP	$2,657	3,031	3,437	3,605	4,395	4,554	4,286	0
2015	**Current Retirees**	**51**	**60**	**38**	**50**	**76**	**20**	**2**	**0**
2016	**Average Benefit**	**$324**	**493**	**842**	**1,857**	**2,922**	**3,429**	**3,956**	**0**
2016	Average FAP	$2,840	2,721	2,889	3,747	4,316	4,727	5,147	0
2016	**Current Retirees**	**31**	**26**	**24**	**46**	**81**	**14**	**2**	**0**
2017	**Average Benefit**	**$333**	**523**	**892**	**1,795**	**3,021**	**3,600**	**2,949**	**0**
2017	Average FAP	$2,568	2,707	3,017	3,616	4,639	4,801	3,717	0
2017	**Current Retirees**	**38**	**31**	**31**	**54**	**83**	**12**	**3**	**0**
2018	**Average Benefit**	**$310**	**574**	**1,022**	**1,937**	**2,941**	**3,587**	**2,803**	**0**
2018	Average FAP	$2,585	3,021	3,381	3,933	4,559	4,957	3,909	0
2018	**Current Retirees**	**31**	**34**	**40**	**51**	**69**	**10**	**1**	**0**

FAP = Final Average Pay

Schedule of Average Monthly Benefit Payments

Uniformed Patrol

By Years of Service

Retired In Fiscal Year		0-10	11-15	16-20	21-25	26-30	31-35	36-40	41+
2009	**Average Benefit**	**$0**	**949**	**0**	**2,686**	**5,580**	**5,740**	**6,161**	**7,369**
2009	Average FAP	$0	2,557	0	3,711	6,140	5,832	5,565	5,974
2009	**Current Retirees**	**0**	**1**	**0**	**2**	**6**	**16**	**6**	**1**
2010	**Average Benefit**	**$0**	**1,156**	**1,582**	**0**	**5,142**	**6,928**	**7,496**	**0**
2010	Average FAP	$0	2,749	3,072	0	5,625	6,668	7,201	0
2010	**Current Retirees**	**0**	**3**	**1**	**0**	**7**	**8**	**2**	**0**
2011	**Average Benefit**	**$646**	**1,174**	**0**	**2,904**	**5,101**	**6,519**	**7,941**	**0**
2011	Average FAP	$2,245	3,051	0	4,595	5,981	6,366	6,746	0
2011	**Current Retirees**	**1**	**2**	**0**	**2**	**8**	**8**	**1**	**0**
2012	**Average Benefit**	**$0**	**737**	**0**	**3,949**	**5,038**	**6,425**	**0**	**0**
2012	Average FAP	$0	2,463	0	5,098	6,012	6,461	0	0
2012	**Current Retirees**	**0**	**1**	**0**	**1**	**9**	**16**	**0**	**0**
2013	**Average Benefit**	**$567**	**0**	**1,690**	**4,294**	**5,263**	**6,074**	**8,558**	**0**
2013	Average FAP	$1,972	0	3,917	6,507	6,473	6,505	7,510	0
2013	**Current Retirees**	**2**	**0**	**2**	**2**	**9**	**8**	**1**	**0**
2014	**Average Benefit**	**$487**	**0**	**0**	**3,794**	**5,176**	**6,295**	**7,156**	**0**
2014	Average FAP	$2,503	0	0	6,070	6,528	6,580	6,237	0
2014	**Current Retirees**	**5**	**0**	**0**	**1**	**24**	**11**	**1**	**0**
2015	**Average Benefit**	**$761**	**903**	**0**	**4,019**	**5,161**	**6,386**	**0**	**0**
2015	Average FAP	$3,119	4,458	0	6,736	6,655	6,951	0	0
2015	**Current Retirees**	**1**	**1**	**0**	**2**	**20**	**10**	**0**	**0**
2016	**Average Benefit**	**$289**	**1,017**	**0**	**3,969**	**4,759**	**6,063**	**0**	**0**
2016	Average FAP	$2,599	3,804	0	6,405	6,607	7,039	0	0
2016	**Current Retirees**	**1**	**1**	**0**	**4**	**13**	**4**	**0**	**0**
2017	**Average Benefit**	**$533**	**1,030**	**2,861**	**3,933**	**4,746**	**6,616**	**6,891**	**0**
2017	Average FAP	$2,791	3,804	5,548	5,621	6,786	7,148	7,077	0
2017	**Current Retirees**	**2**	**2**	**1**	**1**	**29**	**2**	**1**	**0**
2018	**Average Benefit**	**$371**	**992**	**1,430**	**3,580**	**4,617**	**0**	**0**	**0**
2018	Average FAP	$2,566	3,430	3,943	7,001	6,771	0	0	0
2018	**Current Retirees**	**2**	**3**	**1**	**4**	**25**	**0**	**0**	**0**

FAP = Final Average Pay

Schedule of Average Monthly Benefit Payments

Civilian Patrol

By Years of Service

Retired In Fiscal Year		0-10	11-15	16-20	21-25	26-30	31-35	36-40	41+
2009	**Average Benefit**	**$233**	**388**	**725**	**0**	**2,505**	**2,434**	**2,104**	**2,670**
2009	Average FAP	$2,090	1,874	2,135	0	3,690	3,369	3,140	2,679
2009	**Current Retirees**	**4**	**6**	**3**	**0**	**11**	**8**	**2**	**2**
2010	**Average Benefit**	**$273**	**516**	**1,262**	**1,275**	**2,709**	**2,007**	**4,198**	**0**
2010	Average FAP	$2,141	2,125	3,091	2,654	4,445	3,188	5,179	0
2010	**Current Retirees**	**7**	**3**	**5**	**8**	**4**	**3**	**2**	**0**
2011	**Average Benefit**	**$340**	**553**	**943**	**1,650**	**2,820**	**2,839**	**0**	**0**
2011	Average FAP	$2,526	2,265	2,469	3,496	4,096	3,842	0	0
2011	**Current Retirees**	**4**	**6**	**6**	**11**	**13**	**8**	**0**	**0**
2012	**Average Benefit**	**$287**	**537**	**1,324**	**1,510**	**2,568**	**2,397**	**0**	**0**
2012	Average FAP	$2,133	2,537	3,501	3,086	3,690	3,458	0	0
2012	**Current Retirees**	**7**	**4**	**4**	**7**	**16**	**6**	**0**	**0**
2013	**Average Benefit**	**$327**	**548**	**1,070**	**1,610**	**2,212**	**3,074**	**0**	**0**
2013	Average FAP	$2,723	2,551	2,888	3,332	3,359	4,003	0	0
2013	**Current Retirees**	**13**	**9**	**7**	**9**	**9**	**6**	**0**	**0**
2014	**Average Benefit**	**$304**	**565**	**956**	**1,806**	**2,526**	**2,579**	**0**	**0**
2014	Average FAP	$2,319	2,802	2,505	3,580	3,792	3,105	0	0
2014	**Current Retirees**	**9**	**12**	**7**	**7**	**13**	**3**	**0**	**0**
2015	**Average Benefit**	**$300**	**606**	**1,057**	**1,689**	**2,357**	**3,259**	**0**	**0**
2015	Average FAP	$2,342	2,586	2,999	3,453	3,785	4,911	0	0
2015	**Current Retirees**	**12**	**11**	**8**	**13**	**13**	**6**	**0**	**0**
2016	**Average Benefit**	**$212**	**570**	**884**	**1,915**	**2,407**	**4,418**	**0**	**0**
2016	Average FAP	$2,468	2,629	2,989	3,532	3,820	5,718	0	0
2016	**Current Retirees**	**7**	**9**	**5**	**8**	**15**	**1**	**0**	**0**
2017	**Average Benefit**	**$304**	**619**	**1,134**	**1,412**	**2,688**	**3,076**	**2,823**	**0**
2017	Average FAP	$2,614	2,722	3,460	3,301	4,270	4,425	3,919	0
2017	**Current Retirees**	**7**	**6**	**7**	**13**	**18**	**5**	**1**	**0**
2018	**Average Benefit**	**$176**	**633**	**982**	**1,800**	**2,512**	**2,355**	**4,907**	**0**
2018	Average FAP	$1,955	2,956	3,452	3,766	3,996	3,379	7,510	0
2018	**Current Retirees**	**3**	**7**	**6**	**8**	**11**	**4**	**1**	**0**

FAP = Final Average Pay

Schedule of Average Monthly Benefit Payments

MPERS

By Years of Service

Retired In Fiscal Year		0-10	11-15	16-20	21-25	26-30	31-35	36-40	41+
2009	**Average Benefit**	**$0**	**0**	**0**	**0**	**0**	**3,126**	**0**	**9,440**
2009	Average FAP	$0	0	0	0	0	5,922	0	9,989
2009	**Current Retirees**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**1**
2012	**Average Benefit**	**$0**	**0**	**0**	**0**	**4,889**	**0**	**0**	**0**
2012	Average FAP	$0	0	0	0	7,087	0	0	0
2012	**Current Retirees**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**
2013	**Average Benefit**	**$0**	**0**	**0**	**0**	**0**	**9,997**	**0**	**0**
2013	Average FAP	$0	0	0	0	0	11,108	0	0
2013	**Current Retirees**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
2015	**Average Benefit**	**$0**	**0**	**0**	**0**	**0**	**4,351**	**0**	**0**
2015	Average FAP	$0	0	0	0	0	4,764	0	0
2015	**Current Retirees**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
2016	**Average Benefit**	**$0**	**0**	**0**	**3,405**	**0**	**0**	**0**	**0**
2016	Average FAP	$0	0	0	9,414	0	0	0	0
2016	**Current Retirees**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**

Note: There were no retirements during the years not shown above.
FAP = Final Average Pay

Active Member Data

Schedule of Participating Employers

	MoDOT		Patrol		MPERS		Total	
	Employees	%	Employees	%	Employees	%	Employees	%
2009	6,601	74.90	2,199	24.95	13	0.15	8,813	100
2010	6,164	73.21	2,243	26.64	13	0.15	8,420	100
2011	5,796	71.03	2,350	28.80	14	0.17	8,160	100
2012	5,093	68.42	2,337	31.39	14	0.19	7,444	100
2013	4,985	67.95	2,336	31.84	15	0.21	7,336	100
2014	5,041	67.98	2,357	31.79	17	0.23	7,415	100
2015	4,993	67.72	2,364	32.06	16	0.22	7,373	100
2016	5,059	67.70	2,398	32.09	16	0.21	7,473	100
2017	5,056	67.86	2,379	31.93	16	0.21	7,451	100
2018	5,065	68.31	2,334	31.48	16	0.22	7,415	100

Data for this chart is As of June 30, 2018.

Active Member Data
For the Year Ended June 30, 2018

By Age

Closed Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	87	63	13	10	1
41 - 45	394	241	38	115	0
46 - 50	779	476	66	233	4
51 - 55	670	432	93	144	1
56 - 60	347	265	53	29	0
61 - 65	114	98	16	0	0
66+	14	10	4	0	0
Total	**2,405**	**1,585**	**283**	**531**	**6**
Average Age		**50**	**51**	**48**	**47**

Year 2000 Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	78	33	16	29	0
31 - 35	384	216	58	110	0
36 - 40	558	324	97	135	2
41 - 45	413	279	56	77	1
46 - 50	316	234	60	20	2
51 - 55	299	235	55	8	1
56 - 60	260	212	47	1	0
61 - 65	118	93	25	0	0
66+	15	7	8	0	0
Total	**2,441**	**1,633**	**422**	**380**	**6**
Average Age		**45**	**45**	**37**	**44**

Year 2000 Plan - 2011 Tier

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	29	27	2	0	0
21 - 25	464	324	67	73	0
26 - 30	638	393	90	154	1
31 - 35	410	299	56	54	1
36 - 40	268	211	38	19	0
41 - 45	200	161	32	6	1
46 - 50	220	175	41	4	0
51 - 55	154	121	32	1	0
56 - 60	128	97	30	0	1
61 - 65	47	31	16	0	0
66+	11	8	3	0	0
Total	**2,569**	**1,847**	**407**	**311**	**4**
Average Age		**36**	**37**	**28**	**41**

Active Member Data
For the Year Ended June 30, 2018

By Years of Service

Closed Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	1	1	0	0	0
01 - 05	2	0	1	1	0
06 - 10	15	7	7	1	0
11 - 15	12	7	4	1	0
16 - 20	635	471	75	88	1
21 - 25	1,052	637	116	296	3
26 - 30	496	331	50	114	1
31 - 35	159	107	22	29	1
36 - 40	24	17	6	1	0
41 - 45	7	7	0	0	0
46+	2	0	2	0	0
Total	**2,405**	**1,585**	**283**	**531**	**6**
Average Service		**23**	**23**	**24**	**25**

Year 2000 Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	19	16	3	0	0
01 - 05	70	51	18	1	0
06 - 10	728	446	145	135	2
11 - 15	1,138	772	176	187	3
16 - 20	475	342	77	55	1
21 - 25	7	3	3	1	0
26 - 30	3	2	0	1	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	1	1	0	0	0
46+	0	0	0	0	0
Total	**2,441**	**1,633**	**422**	**380**	**6**
Average Service		**12**	**12**	**12**	**13**

Year 2000 Plan - 2011 Tier

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	583	478	81	24	0
01 - 05	1,852	1,349	278	221	4
06 - 10	134	20	48	66	0
11 - 15	0	0	0	0	0
16 - 20	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**2,569**	**1,847**	**407**	**311**	**4**
Average Service		**2**	**3**	**4**	**5**

Terminated Vested Member Data

For the Year Ended June 30, 2018

By Age

Closed Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	40	33	6	1	0
41 - 45	191	155	22	13	1
46 - 50	327	236	27	64	0
51 - 55	352	284	34	34	0
56 - 60	207	185	22	0	0
61 - 65	26	24	2	0	0
66+	2	2	0	0	0
Total	**1,145**	**919**	**113**	**112**	**1**
Average Age	**0**	**50**	**50**	**48**	**41**

Year 2000 Plan

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	12	11	1	0	0
31 - 35	144	112	20	12	0
36 - 40	216	171	30	15	0
41 - 45	183	157	15	11	0
46 - 50	123	104	16	3	0
51 - 55	81	67	12	2	0
56 - 60	54	49	5	0	0
61 - 65	4	4	0	0	0
66+	0	0	0	0	0
Total	**817**	**675**	**99**	**43**	**0**
Average Age	**0**	**42**	**41**	**39**	**0**

Year 2000 Plan - 2011 Tier

Age	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 21	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	8	1	3	4	0
31 - 35	5	2	2	1	0
36 - 40	5	2	1	2	0
41 - 45	2	2	0	0	0
46 - 50	2	1	1	0	0
51 - 55	1	1	0	0	0
56 - 60	0	0	0	0	0
61 - 65	0	0	0	0	0
66+	0	0	0	0	0
Total	**23**	**9**	**7**	**7**	**0**
Average Age	**0**	**39**	**33**	**32**	**0**

Terminated Vested Member Data
For the Year Ended June 30, 2018

By Years of Service

Closed Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	0	0	0	0	0
01 - 05	132	98	16	18	0
06 - 10	483	373	46	63	1
11 - 15	297	247	31	19	0
16 - 20	179	153	17	9	0
21 - 25	49	44	3	2	0
26 - 30	5	4	0	1	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**1,145**	**919**	**113**	**112**	**1**
Average Service		**11**	**11**	**9**	**8**

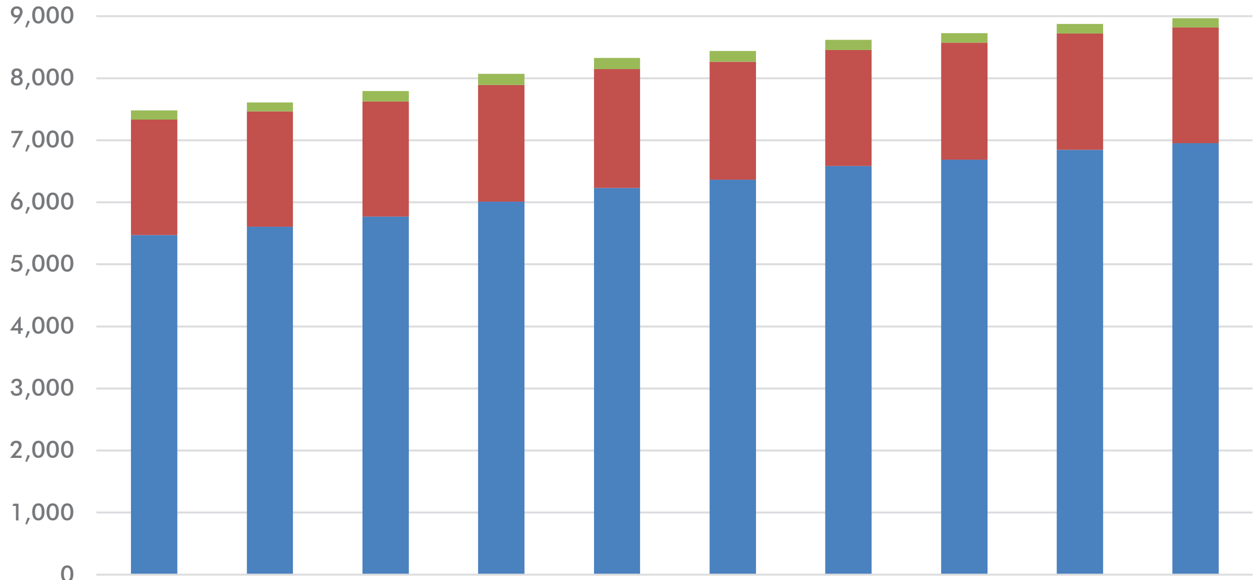
Year 2000 Plan

Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	0	0	0	0	0
01 - 05	123	101	18	4	0
06 - 10	520	429	61	30	0
11 - 15	160	136	18	6	0
16 - 20	13	9	1	3	0
21 - 25	1	0	1	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**817**	**675**	**99**	**43**	**0**
Average Service		**8**	**8**	**9**	**0**

Year 2000 Plan - 2011 Tier

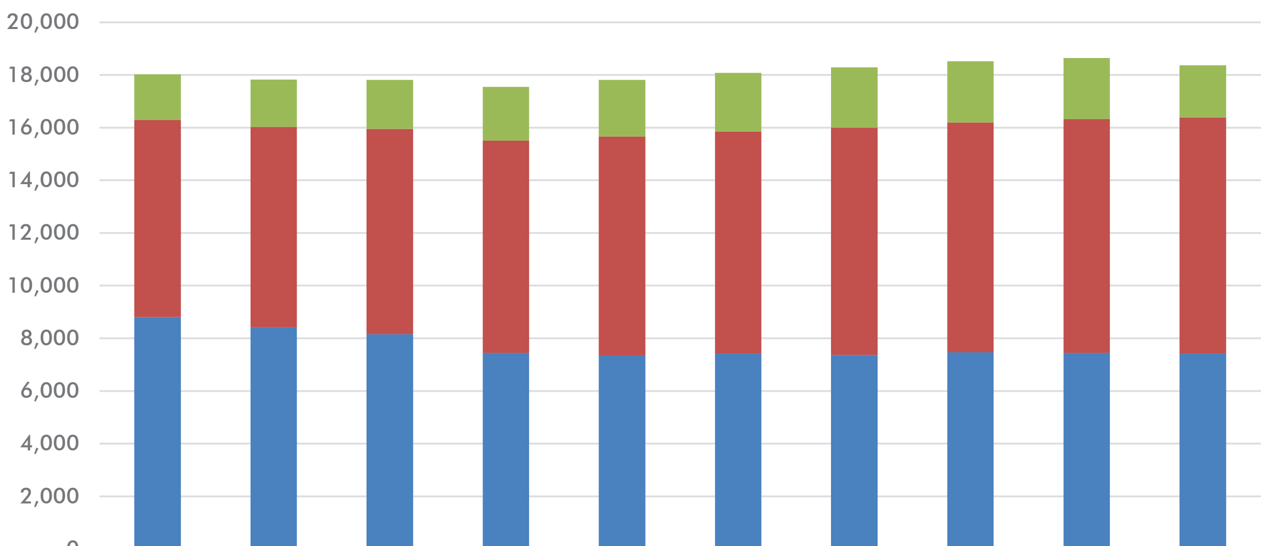
Years of Service	Total	MoDOT	Civilian Patrol	Uniformed Patrol	MPERS
< 01	0	0	0	0	0
01 - 05	14	8	2	4	0
06 - 10	9	1	5	3	0
11 - 15	0	0	0	0	0
16 - 20	0	0	0	0	0
21 - 25	0	0	0	0	0
26 - 30	0	0	0	0	0
31 - 35	0	0	0	0	0
36 - 40	0	0	0	0	0
41 - 45	0	0	0	0	0
46+	0	0	0	0	0
Total	**23**	**9**	**7**	**7**	**0**
Average Service		**5**	**6**	**6**	**0**

Benefit Recipients

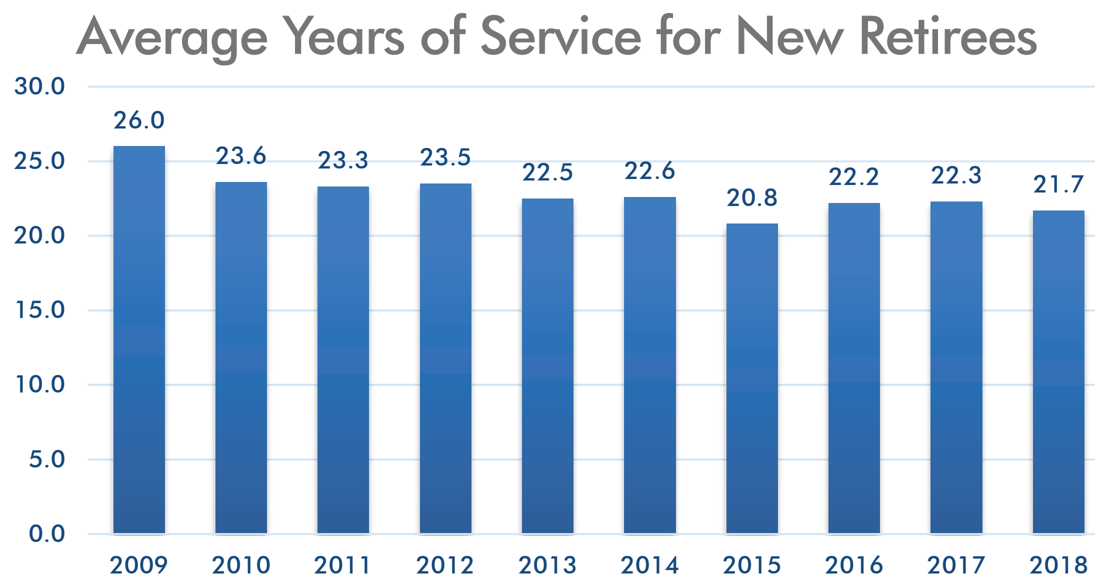


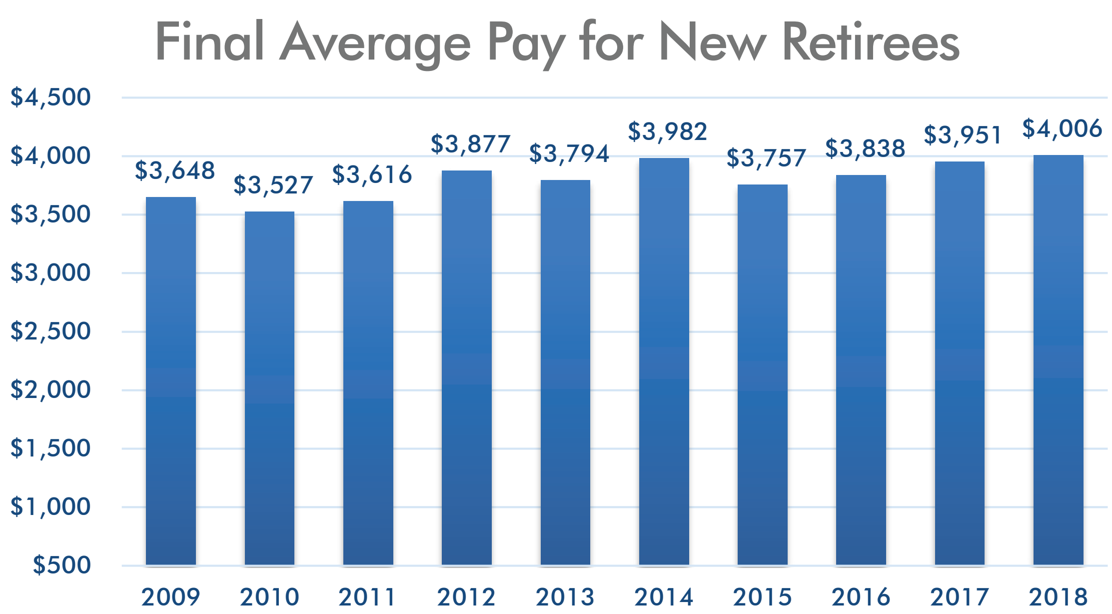
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Disabilities	146	142	166	175	178	173	164	155	155	148
Survivors	1,863	1,862	1,855	1,880	1,914	1,900	1,874	1,882	1,875	1,863
Retirees	5,471	5,606	5,771	6,013	6,234	6,365	6,583	6,690	6,846	6,956

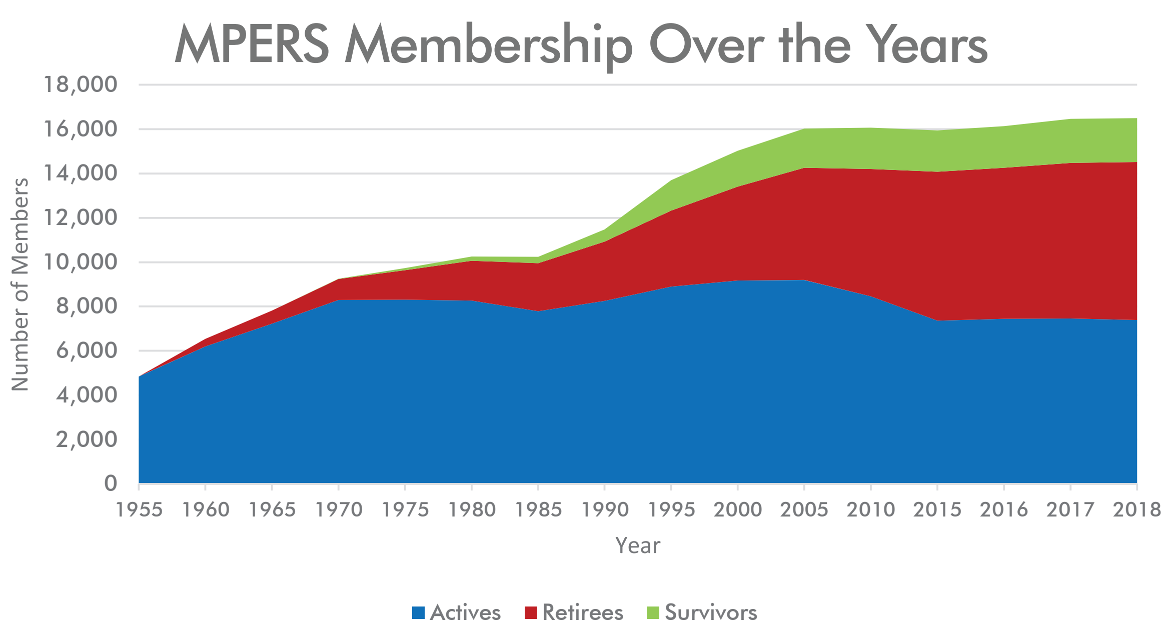
Membership Distribution



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Term Vested Members	1,737	1,799	1,864	2,038	2,153	2,222	2,300	2,329	2,319	1,985
Benefit Recipients	7,480	7,610	7,792	8,068	8,326	8,438	8,621	8,727	8,876	8,967
Active Members	8,813	8,420	8,160	7,444	7,336	7,415	7,373	7,473	7,451	7,415


Average Years of Service for New Retirees
30.0
25.0
20.0
15.0
10.0
5.0
0.0
26.0
23.6
23.3
23.5
22.5
22.6
20.8
22.2
22.3
21.7
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


Final Average Pay for New Retirees
$4,500
$4,000
$3,500
$3,000
$2,500
$2,000
$1,500
$1,000
$500
$3,648
$3,527
$3,616
$3,877
$3,794
$3,982
$3,757
$3,838
$3,951
$4,006
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018


MPERS Membership Over the Years
Number of Members
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2016
2017
2018
Year
Actives
Retirees
Survivors

Location of MPERS Retirees

For the Year Ended June 30, 2018

This map represents the demographic distribution of retirees by state and country.